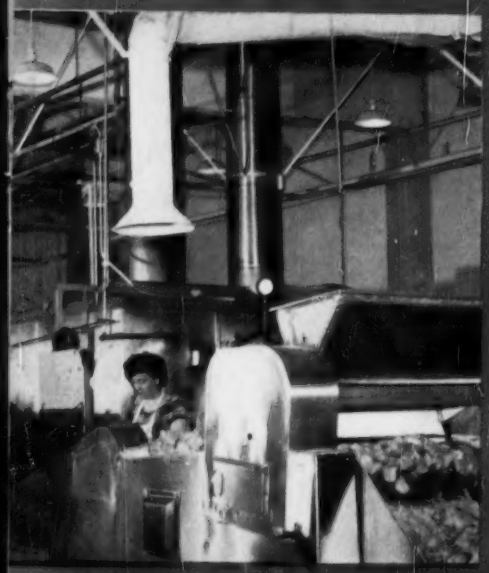
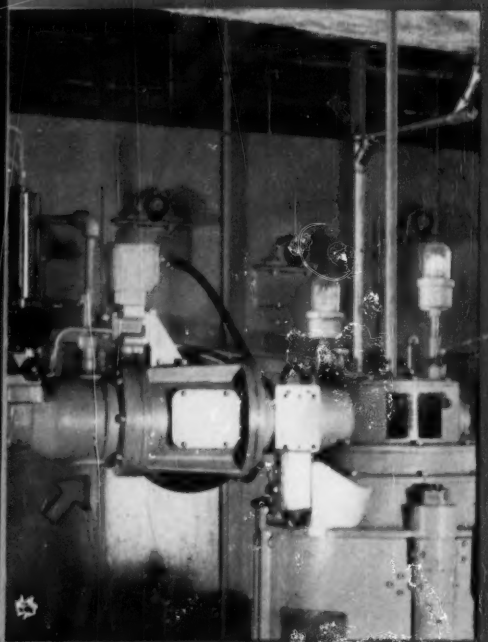
JANUARY 1955
35 CENTS

FOOD ENGINEERING

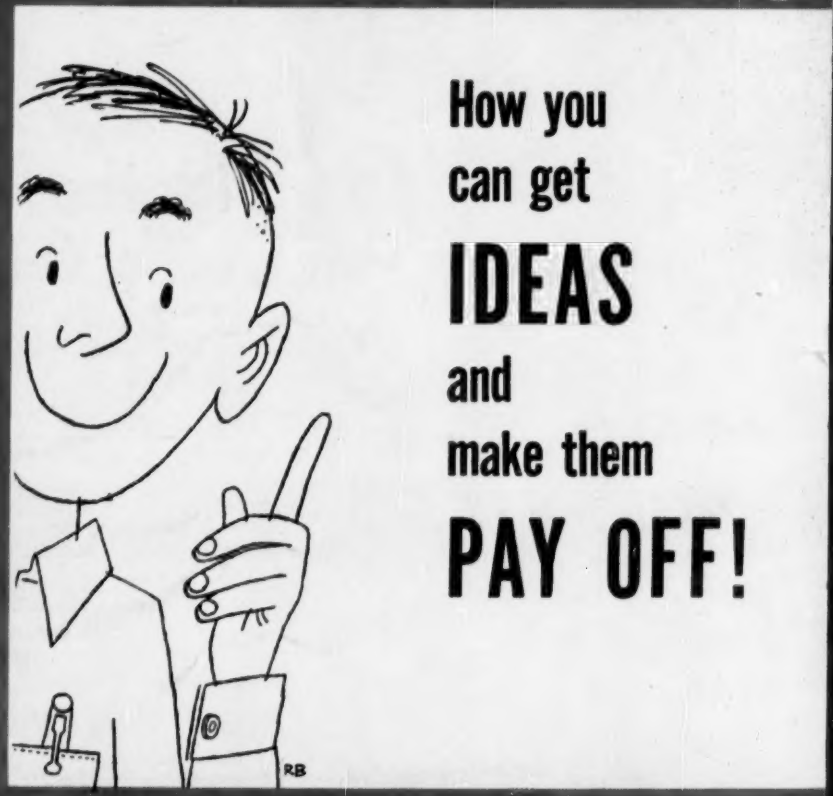
A McGRAW-HILL PUBLICATION



PROCESSING • One of many advances at Nalley's is chip-oil heat exchanger. p. 85



PACKAGING • Can [illegible] by smooth hydraulic motor



How you can get IDEAS and make them PAY OFF!

PERSONNEL • By telling workers how to analyze their jobs, General Mills stimulates ideas which improve operations. p. 59

ALSO: INGREDIENTS • SANITATION • MAINTENANCE
MATERIALS HANDLING • PRODUCTS • TRANSPORTATION
QUALITY CONTROL • INSTRUMENTS • ENGINEERING

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INQUIRY COUPON INSIDE BACK COVER

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Many P.A.'s (and other busy execs.) are sleeping better, smiling oftener because Sterwin delivers the products they want, when they want them, where they want them. Quick delivery from branches in 10 cities covering the United States and Canada.

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January 1955

Volume 27 Number 1

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FOOD ENGINEERING

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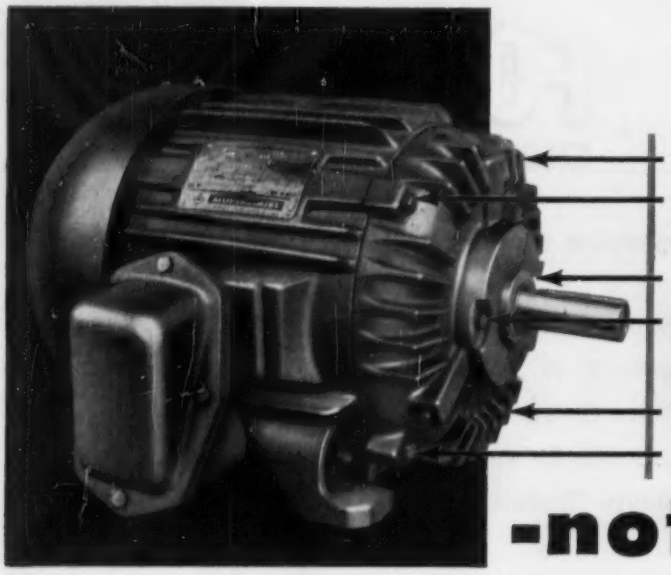
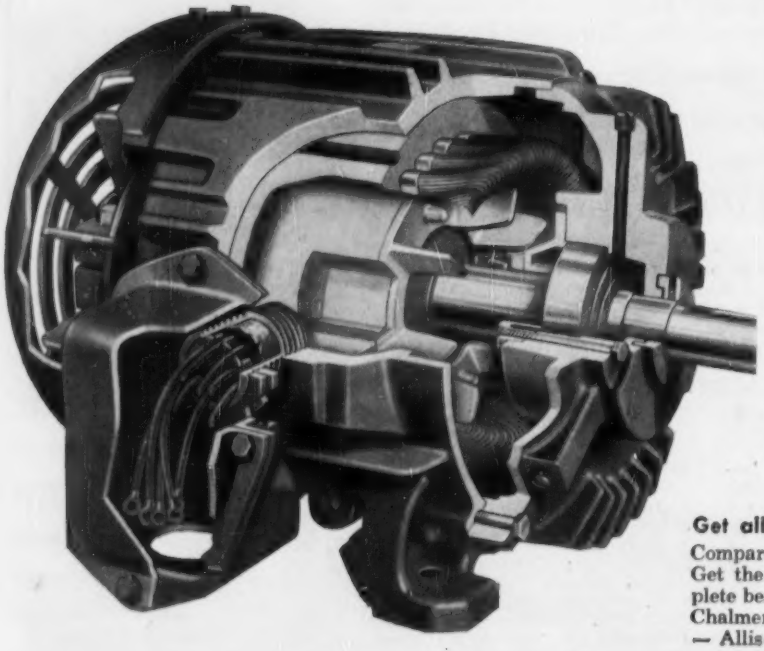


It takes Six Bolts -not just four

to give full bearing protection for greater motor performance



THE TWO EXTRA BOLTS in the end housing of every Allis-Chalmers ball bearing motor are the proof of *extra* protection against bearing failure. These are the bolts that hold the bearing cap tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure . . . protects the grease and the bearing against contamination from dirt and moisture.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

Result? Allis-Chalmers motors pay off in longer, trouble-free bearing life, lower motor maintenance.

Get all the facts . . . judge for yourself — Compare Allis-Chalmers motors with other motors. Get the six-bolt construction that gives you complete bearing protection. For proof, see your Allis-Chalmers Office or Authorized Distributor, or write — Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

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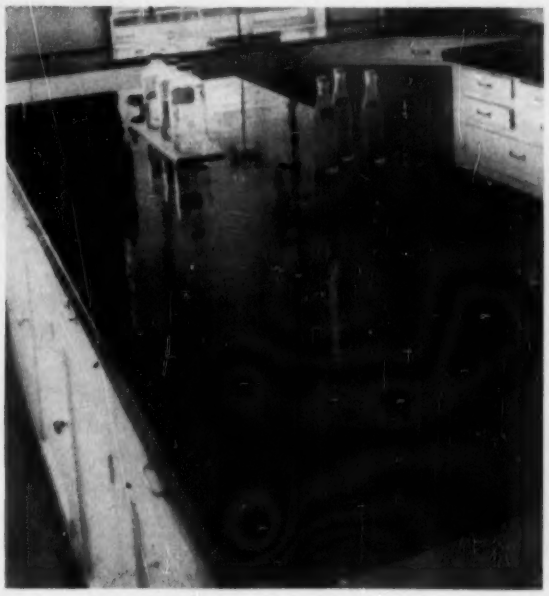
PRACTICAL IDEAS



Food Plant Uses of Furan Resins

Could your plant use an easy-to-apply, safe and economical coating for protecting wood, metal, and concrete against chemical attack? If so, furan resins—adaptable to many food factory uses—can be recommended as the answer.

In our plant we have used furan resins for the past year, and we find the coatings notably successful in giving longer life to cheaper base materials.

Chemicals prepared from corn cobs, oat hulls, or paper mill wastes are the basis for furan resins. When a catalyst is added just before the coating is used, the brown liquid changes to a hard, jet-black solid.

The catalyzed liquid is not inflammable. It may be applied by spraying, brushing, or dipping. The film left is dry to the touch in 15 to 20 min. at ordinary temperatures, and it is ready for a second coat within 24 hr. Full chemical resistance is developed in two or three days. However, baking with a hot air dryer at 150 deg. F. completes the cure in a few hours.

Congealing time (pot life) can be controlled by adding more or less catalyst. If pot life must be 2-3 hr., an inhibitor can always be used.

The resin is unusually resistant to chemicals. Main exceptions are strong oxidizing acids, nitric and chromic. Inertness of furan resins, plus the absence of any objectionable solvents and plasticizers, makes this coating suitable for contact with foods.

We have found many uses for such furan resins as "Jet-Kote" (made by Furane Plastics, Inc., Los Angeles), not only in applications on wooden plates and frames, but also on filter presses (see left photo) which handle pectin liquor (pH 1.8 with sulfuric acid at 180 deg. F.).

The latter units originally had a plate life of about two months, but a resin coating has extended that life many fold. None of our filter presses has failed since we began applying the resin a year ago.

Laboratory bench tops (right photo) have also been treated with this plastic. Once we have covered the wood with glass cloth and applied three coats of resin we have a very durable working surface.

Wood exposed to dampness is also a natural for these coatings. Weakening and rotting are avoided. It has also been found that rusting and chemical attack are prevented when steel tanks, pans, and bins are thus coated.

Likewise reported is success on steel structures, in concrete tanks, on floors, sumps, sewer pipes, and even on undersea structures. The product has also been applied to wood imbedded in soil or concrete, with longer life the result.

There is no need to worry about temperature tolerance of these resins—it's good. Softening does not occur below 500 F. We know of some coatings in daily service in one plant at 350 F. Even temperatures below zero don't affect the resin.

When these resins are applied to most woods or Masonite, primers aren't needed. However, metals must be sandblasted or wire brushed and covered with special primers. Concrete also requires a primer to isolate the curing resins

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paint-up clean-up center for GATX tank cars

Forty tank cars can be serviced in this paint shop at one time. Every surface—interior and exterior—that can be painted, sprayed or brushed gets its protective covering here. After the car has gone through the mechanical department for necessary maintenance and repair work the important car reporting marks, advertisi[illegible] decoration and other stencilled information are applied. These surface finishes applied at the General American car repair shops increase the usefulness of the 48,000 GATX tank cars and keep cars available for duty.

To keep the fleet rolling, General American's more than 30 car repair shops work with the Engineering and Traffic departments to give shippers more dependable service for transporting liquids in bulk.

Car repair shops throughout the U. S. A.

GATX GENERAL AMERICAN TRADE MARK

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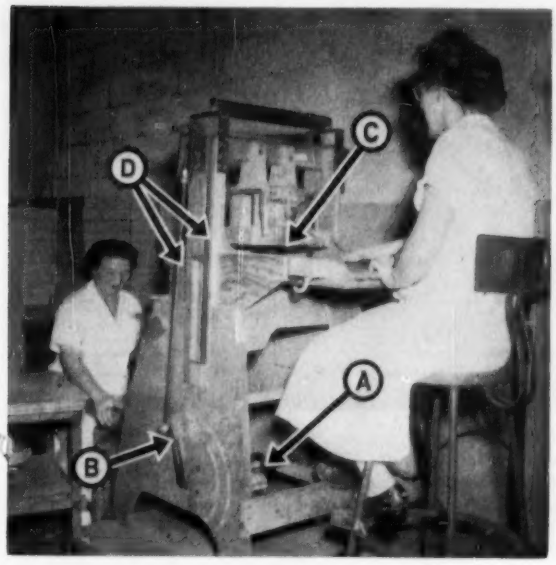
from alkali in the cement. On the other hand, repairs can be made easily, since the resin bonds well with previous and subsequent coats.

For thick coatings of exceptional strength, high chemical resistance, temperature stability, and abrasion resistance, the resins are combined with single or multiple layers of glass cloth. Putty for troweling, lutes, and cements can be made easily by mixing activated silica or activated asbestos with the liquid resin. It will be found that a hard chemically-resistant solid forms quickly.

Different substances may be added. The resins' jet-black color can be changed to gray by adding white titanium oxide powder. Concrete floor covering may be modified further by adding non-skid abrasive powders, and wooden floors are protected well by furan resins reinforced with glass cloth.

The high solids content of the liquid resin results from addition of nothing but 3 to 5% of liquid catalyst. Since curing doesn't depend upon evaporation of considerable solvent, the per-gallon cost may appear high, until the active-ingredient content is considered. Of course, covering power and applied cost depend upon surface porosity. The ranges are 50 to 200 sq. ft. to a gallon and 3.8¢ to 15¢ per sq. ft.

From our experience, these resins, seem to have a promising future both inside and outside the food industry. Many interesting applications are possible when they are combined with other resins or reinforced with various materials. The manufacturer of Jet-Kote is well equipped with experience, literature and test facilities to advise on special applications.—*Ray Cox, Research Manager, Bireley's Division, General Foods Corp., Hollywood, Calif.*

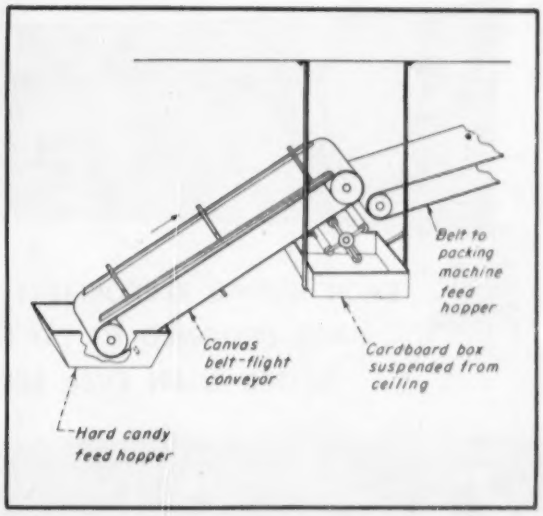


Speeds Operation of Box Former

By removing the foot pedal from our semi-automatic carton-forming machine to make it motor-operated, we've increased output from 25 to 45 cartons per minute.

Installed was a ¼-hp. motor hooked to a horizontal shaft (A) driving eccentric (B) that moves carton-forming frame (C) up and down in guides (D).

Carton-forming machine is designed either for one-cycle operation by means of foot switch or for continuous performance.—*Larry Flowers, Plant Engineer, Emil Donut Corp., Chicago.*


Belt to packing machine feed hopper
Canvas belt-flight conveyor
Cardboard box suspended from ceiling
Hard candy feed hopper

Removes Candy Stuck to Conveyor

From the manufacturing department of F&F Laboratory, Chicago, hard candy is delivered to the packaging machine feed belt by a flight conveyor, elevated at an angle of approximately 45 deg.

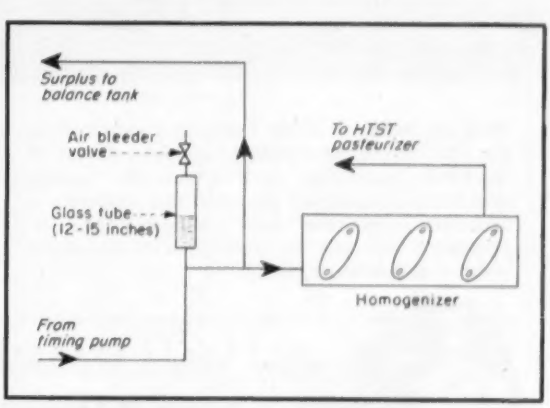
Any candy sticking to the belt and rounding the top pulley, whether whole pieces or broken particles, either was returned to the feed hopper or dropped to clutter the floor. It was, therefore, necessary to provide a method of removing all adherring candy particles from the belt before its return.

This was accomplished by installing a unit similar to a star wheel. Each prong of the wheel is a 2-in. dia. roller from a roller conveyor.

This constitutes a star wheel type belt shaker operated by movement of the flights of the belt elevator. As each roller comes in contact with the belt, the latter is tightened, becoming slack again as the roller moves on.

Thus a slight shaking or vibratory motion is set up which loosens the candy from the belt.

In the path of the dropping candy particles is a suspended platform on which can be placed a large cardboard box or carton, readily removable for dumping after it fills with candy particles.—*FE Staff*



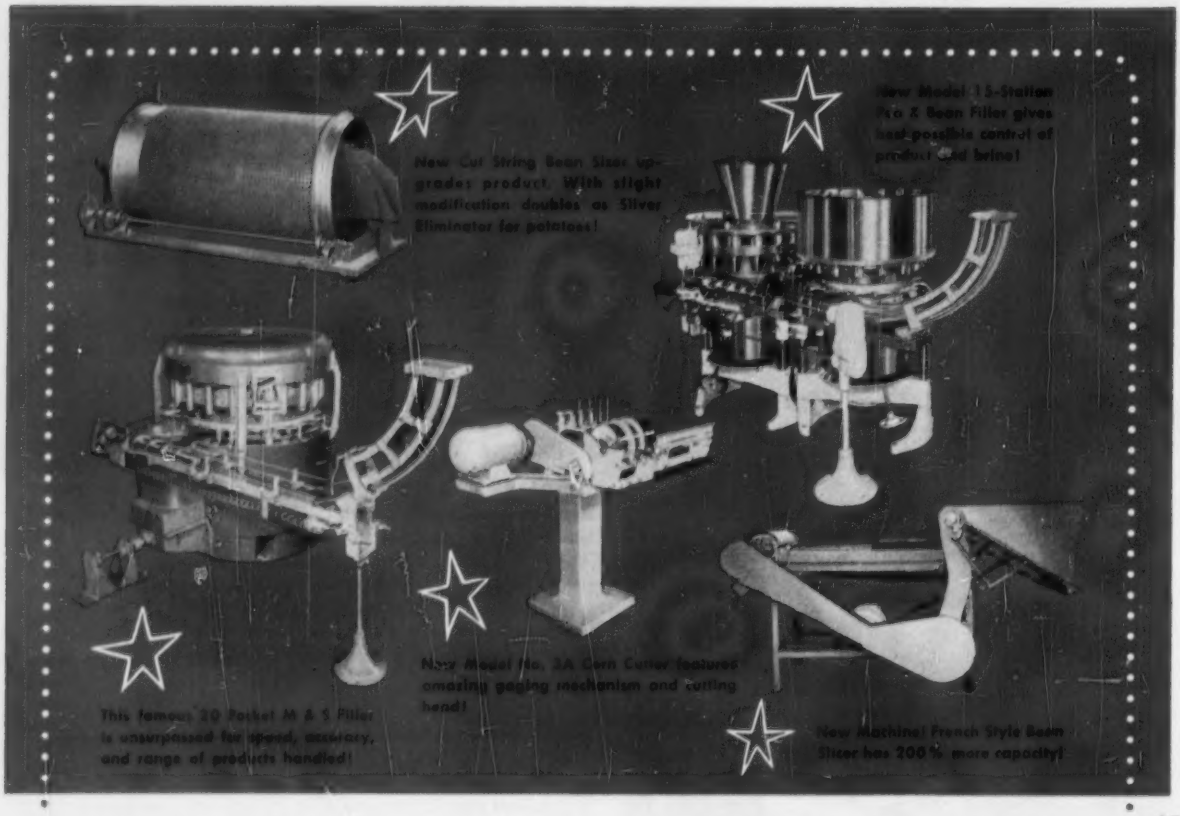
Collects Air from Homogenizer

Devised at the Ashley Dairy, Battle Creek, Mich., was a simple effective means to keep air from homogenized milk. Homogenizer is connected to the high-temperature,

SEE THESE NEW AND IMPROVED MODELS OF fmc FOOD EQUIPMENT

ON SPECIAL DISPLAY AT THE '55 CANNERS SHOW IN CHICAGO
BOOTH NO. 1
FEB. 19-23

EACH A STAR PERFORMER!
EACH DESIGNED TO DO ITS JOB
BETTER THAN EVER BEFORE!


New Cut String Bean Sizer upgrades product. With slight modification doubles as Sliver Eliminator for potatoes!
New Model 15-Station Pea & Bean Filler gives best possible control of product and brine!
This famous 20 Pocket M & S Filler is unsurpassed for speed, accuracy, and range of products handled!
New Model No. 2A Corn Cutter features amazing gaging mechanism and cutting head!
New Machine! French Style Bean Slicer has 200% more capacity!

These are but a few of the machines you will see at the FMC booth. Also included will be a display of the FMC "Sterilmatic" cooking principle—the only commercially accepted principle that combines a "continuous operation" with "rolling can agitation" to provide fast, even heat penetration for almost any product and any can size.

See the revolutionary KEY Froth Flotation Cleaner that has set new standards of efficiency for cleaning peas, corn and lima beans; and the continuous Carruthers' Multi-Pak Filler that fills either whole or French-sliced green beans into cans at high speeds. Stop by and visit us at Booth No. 1, National Canners Convention in Chicago, February 19 through 23.

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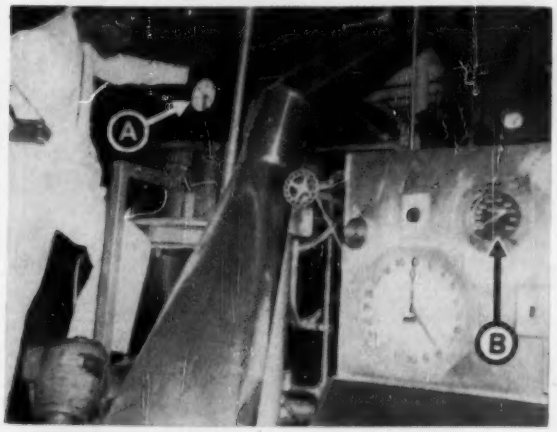
short-time pasteurizing system, but it operates, however, at lower capacities than the pasteurizer.

Attached to the pipe line leading from the HTST pasteurizer timing pump to the suction side of the homogenizer is a 15 in. long glass tube, fitted onto the end of which is an air bleeder valve (see sketch).

After this hook-up is made and operations are started the normal level of milk in the glass tube is marked. Any air coming through the line will rise in the glass tube lowering the level of the milk. Noting a change in normal operating level, the operator can release any excess air before it is pulled into the homogenizer. If on occasions air comes through in excessive quantity, it serves as a warning to check for and eliminate air leaks.—*J. R. Frye, Branch Engineer, Cherry-Burrell Corp., Detroit.*



Checks Thermometers With Alarm

Maintaining accuracy of our cooking thermometers is essential to the production of hard candies. And for that reason, we had a special alarm-type standardization thermometer built to check our cooking-kettle thermometers.

In checking, the sensitive bulb of the standardization instrument (A) is placed alongside that of the process thermometer (B) in a cooking kettle. Temperature of the standardization thermometer is pre-set, as shown in photo, and steam is turned on in the kettle.

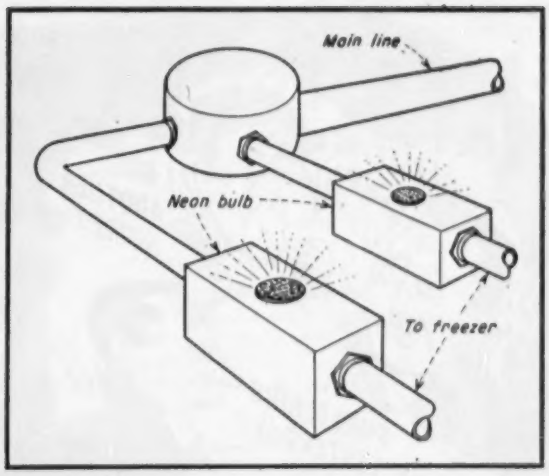
Attendant then watches process thermometer dial to see if temperature checks with that preset on the standardization thermometer at the time latter's bell alarm rings.—*A. B. Cramer, Chief Chemist, F & F Laboratories, Inc., Chicago.*

Switch Box Seal Protects Workers

In many plants, employees hide such "personal" objects as keys, tools, and knives in electrical switchboxes. This, obviously, involves the hazard of touching or shorting "hot" contact points.

To eliminate this practice, we lock our switchboxes with regular railroad car door seals. These are thin, pliable metal strips about 8 in. long and ⅛ in. wide. They are looped through the switch box locking-eye and the ends fastened together.

When necessary, a box ban be opened by snipping the thin metal strip. But the embossed number on each strip has an "official" look which deters workers from tampering with the seal.—*P. Seidel, Superintendent, Kingan & Co., San Francisco.*



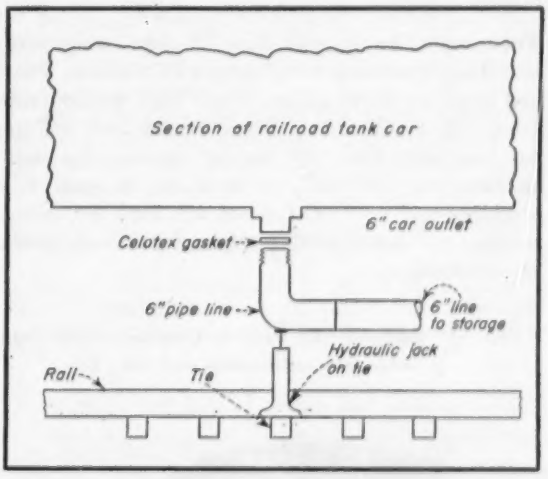
Simple Live Line Indicator

When refrigerated areas are well laid out and adequately insulated, long intervals may occur between the times when refrigerating equipment is in operation. In our plant there was no evidence to the casual observer whether the refrigeration equipment lines were live or not, except when the compressors were running. This was also true of the control equipment in the refrigeration areas.

To make it easy to check at a glance and know whether or not refrigeration equipment lines were operating or not, we have installed neon bulbs in the lines to the freezers. Neon bulbs were chosen because they far outlast ordinary incandescent lamps.

When we realize what a serious condition could result because of a dead line, just during an overnight period, we feel that the lights have long since paid for themselves.

It has become a habit to look for the signals at all times, particularly when closing the plant.—*Robert H. Porter, Carthage Altemont Milk Corp., Carthage, N. Y.*



Improvised Gasket Averts Delay

When a tank car of corn syrup arrived at our plant with an unthreaded outlet, we couldn't connect it to our regular piping. But by improvising a gasket as a compression fitting, we were able to unload the car without delay. And not a drop of syrup was lost.

In running the syrup by gravity to a basement storage

TIRED OF JUST TALKING ABOUT THE WEATHER (IN YOUR PLANT)?

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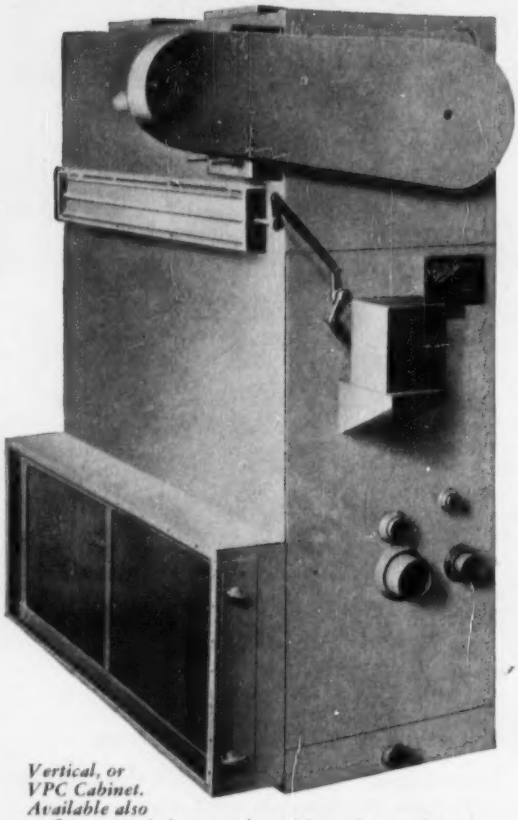
**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*



Vertical, or VPC Cabinet. Available also as flat suspended types, also with washer section. Sections readily demountable for easy installation or servicing. Write for Bulletin 3703A.

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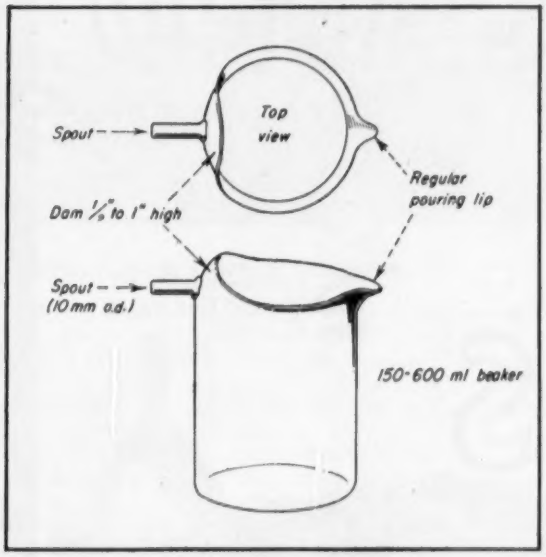
tank, normal procedure is to put steam through the car's heating coils. Then our 6 in. line is connected to the car with a nipple and standard elbow. For this purpose, the car outlet usually has a 6 in. female thread. This time, however—with the thread missing—we had to find another way to do it.

So, a gasket was cut to size from ¾ in. Celotex, and placed between the car outlet and the flange of the elbow on our 6 in. line (see sketch). Then we positioned a hydraulic jack on the railroad tie under the elbow.

Then by raising the jack to compress the gasket, the liquid-tight connection was formed through which we ran the syrup without loss.—*Louis E. Seicrest, Superintendent, Skyland Food Corp., Delta, Colo.*



Safe Home-Made Pouring Beaker

Here's how to make an ordinary beaker into an indispensable laboratory tool for safe and convenient filling of narrow-neck volumetric flasks and/or burettes with any of the "nuisance" chemicals.

Among the latter are ether, chlorophorm, pyridine, glacial acetic acid, and standardized solutions of iodine, permanganate, caustic, etc.

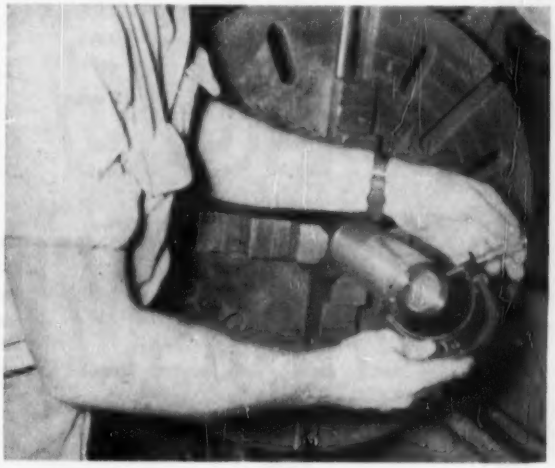
First, select a clean Pyrex beaker in good condition, any size from 150 to 600.

Next, use a blast burner to soften the rim of the beaker on the side opposite to the pouring lip, and with forceps carefully bend the glass inward to form a ½-to-1-in. dam. Height of dam will depend on the size of beaker. Then anneal the glass and allow it to cool.

For the spout, select a 10 in. length of 8 to 10 mm. Pyrex tubing cut clean at the ends. Over the hot tip of the blast burner soften a spot adjacent to the dam on the unworked portion of the beaker (see sketch). Now heat this spout to a white molten consistency while simultaneously warming the tip of the tubing.

When tip of tubing just begins to fire, polish it, then quickly remove both pieces from the heat, immediately placing tubing on the molten spot, and speedily forming a suck point by forcefully sucking on the free end of the tubing with the mouth. This opens the passage into the tube through the wall of the beaker.

After carefully heating around the joint to anneal and also to straighten the spout, allow the piece to cool. Finally, the spout may be cut to any length (preferably about 1 in.) and a fire-polished tip added.—*Harold G. Brock, Analytical Chemist, The Stuart Co., Manufacturing Div., Burbank, Calif.*



Cuts Cost of Bushing Repair

Purchase of bronze bushing stock in 12-ft.-long lengths (see photo) instead of small 13-in. pieces has made it possible to reduce scrap loss in maintenance shop operations at our sugar refinery.

Also, since a continuous-cast 773 bronze bushing (SAE 660) has been used, machine down-time throughout the plant has been reduced.—*Hugh B. Wright, Refined Syrups & Sugars, Inc., Yonkers, N. Y.*

Simple Test Speeds Filtration

When colloidal liquids are to be filtered, a simple test indicates whether the slurry has been sufficiently processed for rapid filtration. Unless colloids are coagulated and pre-

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We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors

NOVEMBER PRACTICAL IDEA WINNER was "Repairing Pipe Leaks With Plastic," submitted by Bror J. Grondal, Engineering Department, Atlantic Gelatine Div., General Foods Corp.

POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

POWELL LUBRICATED PLUG VALVES

FIG. 3059G—300-Pound Steel Flanged End Valve. Sizes 6" to 12".

FIG. 1559—150-Pound Steel Flanged End Valve. Sizes 1" to 4".

POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

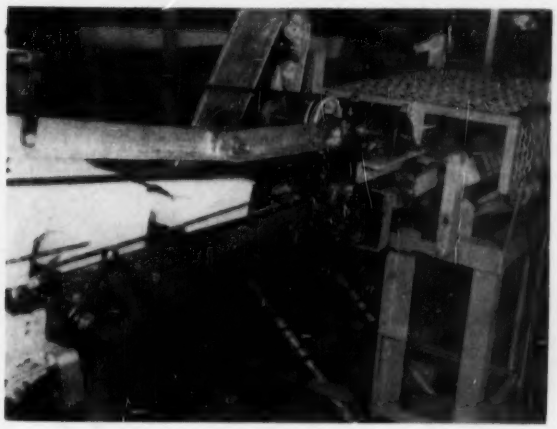
Powell Valves—the *complete* quality line—offer many outstanding features in these new Lubricated Plug Valves, such as quick and sure operation and a positive seal when the valve is closed.

Valves are available with screwed or flanged ends; single, screwed and bolted gland types, and in Semi-Steel, Carbon Steel, Bronze, Ni-Resist, Monel Metal, and Stainless Steel. Semi-Steel valves are rated 175 and 200 pounds W.O.G.; Steel valves, 150 and 300 pounds W.P. Sizes from 1" to 12". Valves in sizes 6" and larger can be furnished with gears for gear operation. Distributors located in principal cities. For descriptive literature—or help on valve problems—write direct to

The Wm. Powell Company, Cincinnati 22, Ohio.....109TH year

cipitated they plug the filter cloths, thus greatly reducing the capacity of the press.

The test consists of streaking an ordinary piece of filter paper with a sample of the slurry. The rate and extent of the spread of clear liquid around the streak can be correlated with ease of filtration.—*FE staff.*



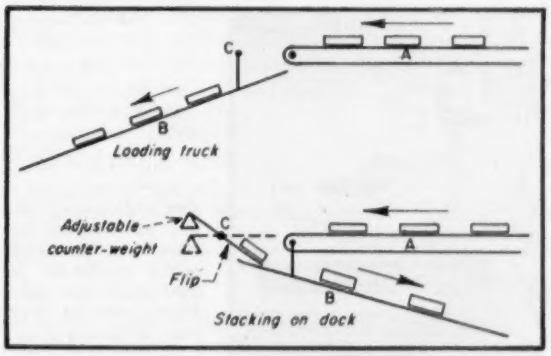
Device Levels Carton Contents

When mechanically filled into cartons, frozen french fried potato strips have a tendency to project above the sides of the container. Unless this irregular fill is leveled, the strips interfere with proper carton closing, if not making it impossible. To correct the condition we designed and built an improved shaker.

Essentially, the unit is comprised of an over-carton belt and a cradled shaking unit driven by eccentric-actuated shaker-arms.

As they enter this unit, carton lids are bent down without distortion, by the over-carton belt (see photo). Side guards impart a lateral, shaking motion to cartons and contents as they move through the unit on a link-conveyor belt. The shaker is powered by a ½-hp motor operating at 1750 rpm, with eccentric geared down to ¼ motor speed.

This shaker has virtually eliminated the unclosed carton problem in our high-speed packaging line.—*Wm. E. Campbell, Frozen Food Packaging Maintenance Chief, J. R. Simplot Co., Food Div., Caldwell, Idaho.*



Flip Reverses Conveyor Discharge

A counterweighted flip, pivoted at the discharge end of an overhead conveyor, enables us to reverse the direction of carton delivery, when necessary.

Normally, the conveyor (A) feeds cartons to a slide (B), from which they are loaded into a trailer (see top sketch). But when the truck is not available, the reversing feature eases dock stacking.

Changeover is simple. Using the same brackets, the slide is reversed and positioned under the conveyor (bottom sketch). Then, as shown in the diagram, the flip is pivoted at the discharge end of the conveyor, at point (C), where slide (B) had been fastened.

In operation, when a carton is delivered onto the flip, its weight tilts the flip until the latter contacts the slide, and the carton is discharged onto the slide. Then, the counterweight returns the flip to the horizontal to receive the next carton.—*Norvel Buros, Production Manager, Erickson Bakery Co., La Crosse, Wis.*

Birthday Remembrance Effective

A once-a-year gift package given personnel at Kekaha Sugar Co., Kauia, Hawaii, always has a fine morale building effect. It goes to each employee on his birthday.

Though impressive, this remembrance, consisting mainly of company products is not costly. The package includes generous samples of the company's products, including sugar cubelets, desert sugar, brown sugar, confectionary sugar, and individually wrapped packages of granulated sugar.

Along with these are recipes, also a booklet showing historical development of the Hawaiian sugar industry and an explanation of the current sugar process from growing of cane to bagging of refined sugar. Accompanying the gift is a birthday card personally signed by the manager.—*Andrew J. Wilson, Chemist, Kekaha Sugar Co., Kauia, Hawaii*

Determined: Cost of Cut Finger

Does it pay to spend "indulgently" on safety campaigns, especially when the effort is toward preventing such "minor" accidents as cuts? Here's the cost of a cut finger—judge for yourself.

Direct Costs

Workman's compensation payment included cost of employee's absence for 38 days, payment to employee for 10% disability of right first finger. Medical payments included surgery and anaesthetic, six examinations, removing sutures, and 17 whirlpool treatments. Total direct cost amounted to $451.63.

Indirect Costs Covered

Replacement on the job, first-aid treatment in plant dispensary, two-minute change-stop, time lost by foreman in investigating accident and arranging for replacement during periods of absence for treatment, etc., were indirect costs incurred. Additional replacements were required to do the injured man's work while he was absent for nine whirlpool treatments. Also included was time spent by chauffeur taking injured man to and from these treatments, and the car mileage and depreciation. Wages were paid to the injured during the period covering the nine treatments.

Other indirect costs included time of the personnel department investigating accident, making out reports, arranging replacement help, auditing bills, etc. The total indirect cost was $719.04, while total cost of this "minor" accident—a cut finger—was $1170.67.—*From "It's Your Business," publication of American Meat Institute.*

Modernizing?

New equipment needs the right instrumentation

When you're planning to install new process equipment, plan to take advantage of the full potential of modern methods of measurement and control. It's the sure way to get top value for your modernization investment . . . for the improvements in production economy, quality, and versatility possible with today's new process equipment depend increasingly on control instrumentation.

Here are two important points that deserve consideration if you're planning to modernize:

1. *Design for control.* Instrumentation is more than a necessary appendage. It's a vital, integrated part of the process itself. *Control design goes hand in hand with process design.*

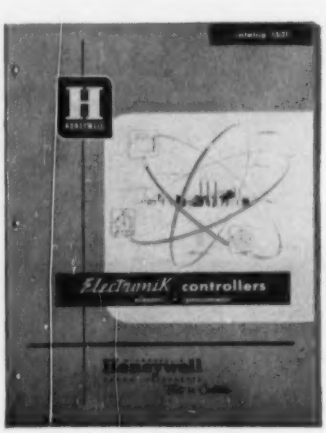
2. *Get the right instrument for the job.* This seems obvious—but all too often instruments may be stretched or squeezed to fit applications for which they were never intended. *Each instrument should fit its function.*

Honeywell's experienced application engineers will be glad to cooperate with your own staff to recommend ways in which you can obtain the full benefit of modern instrumentation.

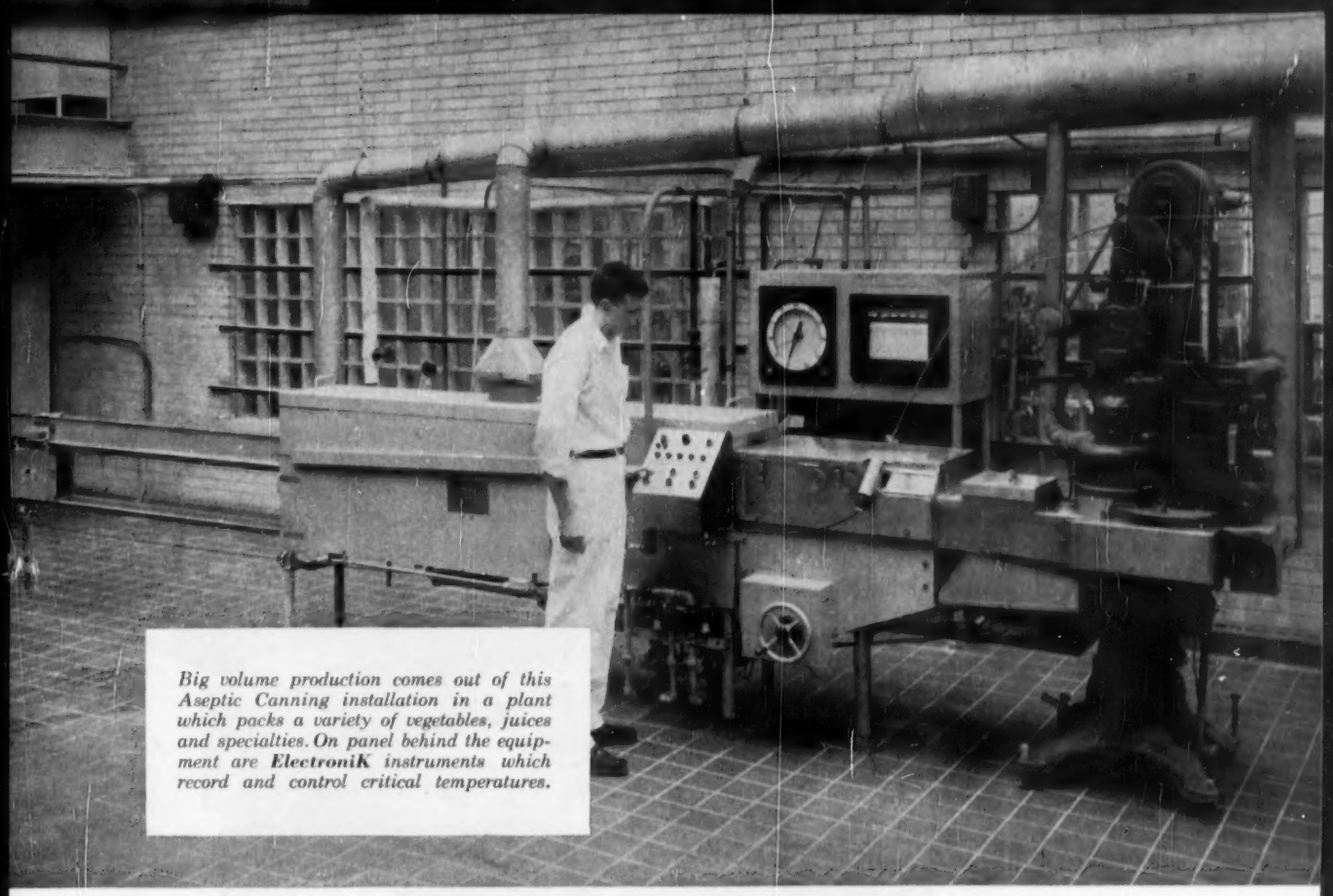
Honeywell offers an exceptionally wide line to choose from. You're sure to find instrumentation with exactly the right performance . . . at the right cost . . . to fit your process.

A talk with your nearby Honeywell sales engineer will give you a detailed picture of what instrumentation can mean in your modernization program. Call him today . . . he's as near as your phone.

*ElectroniK** instruments lend vital precision



For information on the varied line of ***ElectroniK*** *instruments applicable to food processing operations, write for your copy of Catalog 1531,* ***"ElectroniK Controllers."***



Big volume production comes out of this Aseptic Canning installation in a plant which packs a variety of vegetables, juices and specialties. On panel behind the equipment are ***ElectroniK*** *instruments which record and control critical temperatures.*

to aseptic canning process

REVOLUTIONARY is the word for the Martin Aseptic Canning Process. Embodying short-time high-temperature sterilization and aseptic filling, this high-speed operation retains natural flavors, colors and nutritive value of many foods . . . including fruit juices, vegetables and even fresh, whole milk.

To help in the practical realization of this unique concept, the process designers called on *ElectroniK* instruments. Requirements were severe . . . measurements had to be fast and accurate . . . control had to be sensitive and dependable . . . because the process functions at high speed and within close limits. But on every score, *ElectroniK* instrumentation proves equal to the task.

An *ElectroniK* controller holds product temperatures to tight tolerances in the critical heat-exchanger sterilizer, and at the same time provides management with a permanent record as evidence of proper process functioning.

Supplementing this instrument is a multi-point recorder which charts other vital temperatures in the cooling and filling equipment. The whole control center is engineered by Honeywell as a complete, integrated system which incorporates all essential signalling and safety devices.

The same Honeywell combination of accurate instrumentation and process control engineering is ready to serve your own food production operations. For a discussion of your problems, call your local Honeywell sales engineer . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

● **REFERENCE DATA: Write for Data Sheet No. 3.2-15a, "Aseptic Canning Process."**

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Honeywell
BROWN INSTRUMENTS

First in Controls

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NEW PROFITS

from breaded fish, meat and poultry

Introducing the Fry-O-Pac Batterer and Breader for continuous, fully-automatic dipping and breading in less than 9′ of floor space.

1. No tumbling of product — Because of this you get and retain complete, uniform product coverage; eliminate labor in separation of product, and have no product breakage.

2. Practically eliminates breading lumps — Because products once dipped are so transferred to Breader that dripping is completely overcome.

3. Dips and breads *all* types of fish, meats and poultry . . . from delicate oysters and fantail shrimp to odd-shaped poultry and meat pieces. Maximum production capacity is approximately 2000 lbs. per hour dependent upon the product.

4. Is Sanitary — Stainless steel used in product zone; sanitary piping and fittings. Simple wingnut and thumbscrew disassembly permit daily cleaning — easily and quickly.

Here is truly mechanized processing with dependable quality control to help you keep pace with the enthusiastic consumer demand for breaded foods.

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Ask for information, too, on the new Fry-O-Pac Continuous Fryer and space-saving Multi-Tier Cooler, companion units to the Fry-O-Pac Batterer and Breader.

What other breading equipment offers all of these advantages?

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Grandma was a *good* cook . . . with recipe secrets all her own. A pinch of this, a cup of that, and later, warm, sweet fragrances wafted from her kitchen. Back then, it required hours of painstaking care and years of experience to bake a cake. Today, thanks to Victor leavening phosphates, the cake that *didn't rise* is almost non-existent. Brides make perfect cakes . . . puddings in an instant . . . even *five* different kinds of pastries from *one* box of mix. All just as good as "grandma used to make" because today flour millers and food processors depend on Victor for phosphates. They know *it pays* to see Victor. Write Victor Chemical Works . . . 155 N. Wacker Drive, Chicago 6, Illinois . . . In The West: A. R. Maas Division, South Gate, Calif.

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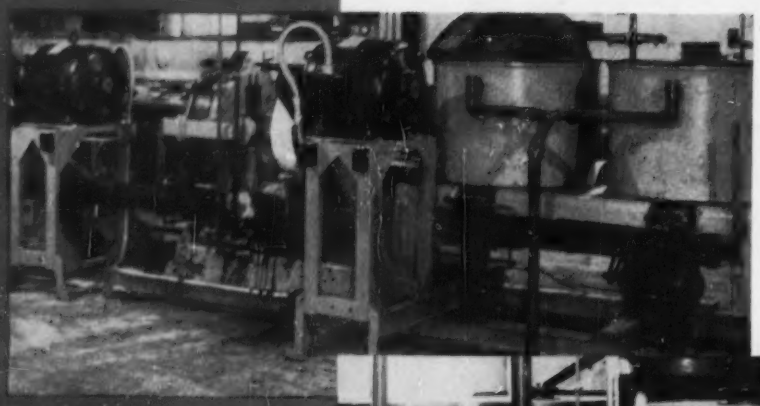
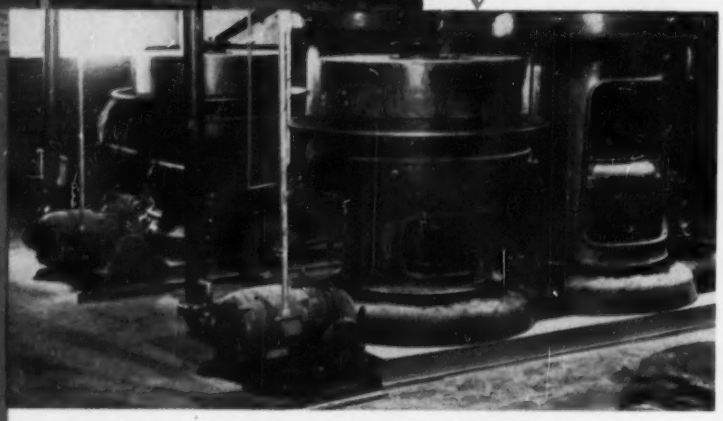
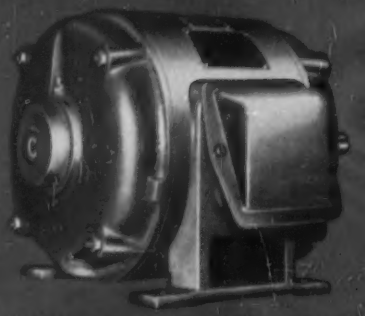


Two 15 H.P. Century Performance Rated Motors drive agitator kettles used in the processing of cocoa products.

Two 3 H.P. Century Performance Rated Gear Motors pack plenty of stamina to help keep these mills operating full time.





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For brilliant clarity and purity of filtered liquids; for greater stability of finished product; for lower filtering costs; Dicalite Filteraids have no superior. Impartial laboratory tests and the experience of many food processors support this statement. Dicalite Filteraids are produced from the nation's highest-grade deposits of diatomite and are processed under strict quality controls to set a new high standard of excellence in diatomaceous filteraids.

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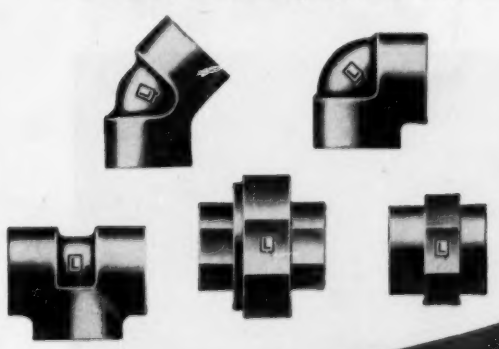
Basic material used for the LUNCOR Valve is polyvinyl chloride (PVC), which resists most industrial chemicals. It is recommended for service at pressures up to 125 psi and temperatures up to 140°F.

A complete line of LUNCOR PVC Fittings is also available from Lunkenheimer — 45° and 90° elbows, tees, flanges, unions, reducing bushings, caps, couplings, and plugs.

For full details, call your local Lunkenheimer Distributor, or write The Lunkenheimer Company, Box 360, Cincinnati 14, Ohio.



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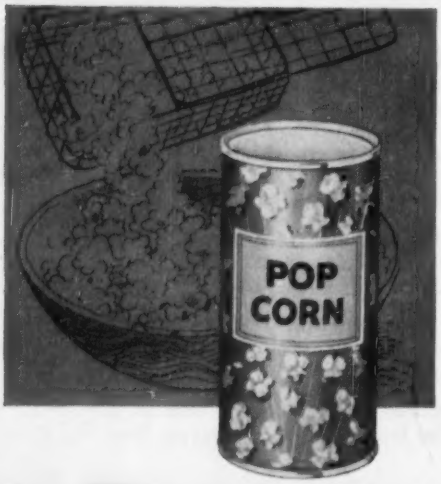

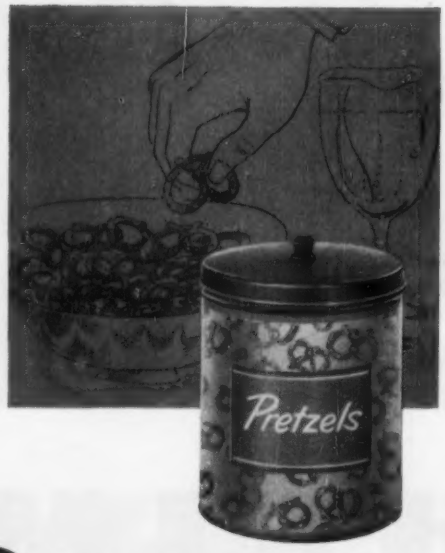

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Is your product listed here?

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brown bread	glazed fruit	plum pudding
candy	ice cream mixes	popcorn
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Battery power is the most dependable industrial truck power available today. It is amazingly efficient because it springs into action instantly, transmitting energy to the wheels with a minimum of moving parts, a minimum of friction. That's why battery-powered trucks have in-service records that are unequalled. There's *no* power like battery power. There's *no* battery power like the Gould "Thirty" with new Diamond "Z" Grids.

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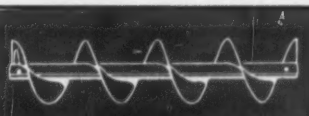
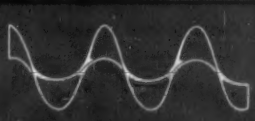
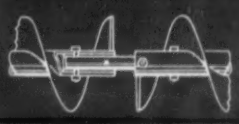
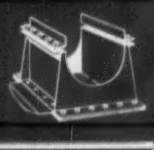
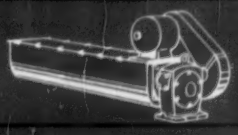
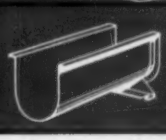
ACCURATELY FORMED FLIGHTING		Link-Belt's specialized machinery assures accurate forming, producing uniformity of flighting curvature.
UNIFORM DIAMETERS		Only specially selected steels are used to meet Link-Belt's rigid specifications.
WIDE RANGE OF HANGERS		Hangers are available in a wide range of styles and mountings with various bearing materials.
EASY ASSEMBLY		Straightness is checked before shipping, and extra care is taken in handling and loading. Jig-drilled coupling bolt holes facilitate assembly.
ON-THE-JOB DISCHARGE OPENING LOCATION		For versatility in locating discharge openings, Link-Belt offers spouts and gates that can be easily installed on the job and bolted or welded in place.
CHOICE OF SPOUTS, GATES		Wide range of fixed or detachable plain discharge spouts or gates. Flat or curved slide type gates can be hand or rack-and-pinion operated.
FULLY INTEGRATED DRIVES		Only Link-Belt builds a complete, pre-integrated line of gear and chain drives, couplings, bearings. One proved source . . . one undivided responsibility.
ACCURATELY FABRICATED TROUGHS		Added refinements of manufacture assure better fit of all components. And Link-Belt offers you a choice of metals to fit your particular application.

These are only a few of the many important performance extras you get with Link-Belt screw conveyors. Ask your Link-Belt representative or authorized stock carrying distributor for 92-page Data Book 2289.

LINK-BELT

13,077

SCREW CONVEYORS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

For more information, use coupon on last page.

These Flo-Sweet services cut your sugar costs

"Talk about service—we even help you plan ahead!" exclaims your Flo-Sweet Engineer. "That's why, when you use Flo-Sweet, you get greater satisfaction at every step. From the time you first consider liquid sugar, during equipment layout and installation, up through carefully timed deliveries—the Flo-Sweet technical staff is at your service. Here are six important ways they can help you save."

FORMULA CONVERSION

Flo-Sweet specialists readily convert your present dry sugar formulas to liquid.

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Flo-Sweet laboratory technicians have long experience in helping customers solve problems involving sugar.

SUGAR SYSTEM LAYOUT

Flo-Sweet engineers' quarter century's experience with liquid sugar systems saves you time and expense.

STORAGE

Flo-Sweet's huge storage facilities free you from carrying costly sugar inventories.

SPECIAL EQUIPMENT

Design and installation of special sugar handling and processing equipment are routine procedures for Flo-Sweet engineers.

DELIVERIES

Flo-Sweet has set the pace for the industry in prompt liquid sugar deliveries.

There's excitement and drama in the history of liquid sugar! Get the inside story in "Pursuit of an Idea"—write for your free copy today.

FLO-SWEET

FIRST IN LIQUID SUGAR

Distributed from Yonkers • Pittsburgh • Toledo • Detroit

REFINED SYRUPS & SUGARS, Inc.

YONKERS, NEW YORK

SERVING INDUSTRIAL SUGAR USERS EXCLUSIVELY

How Taylor *protects* the high quality of its famous wines

Some food processors put up with pipeline corrosion simply because they've come to think of it as a part of the business.

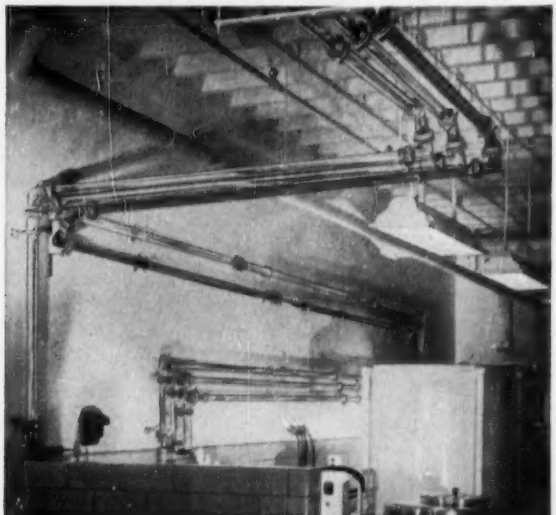
The foods they process contain acids or salt. "They corrode equipment; always have, always will."

How a famous winery solved the problem

Taylor Wine Company, Hammondsport, N. Y., takes every possible step to preserve high product quality and purity. But the liquids its vast pipeline system transports contain corrosive fruit acids—and corrosion in pipe lines is a threat to product quality.

Yet here, where pipeline corrosion *could* be a tough problem, you'll find it's no problem at all. *And it's been that way for 25 years;* for it was 25 years ago that Taylor installed its first PYREX brand pipe.

Today over 1½ miles of sparkling 2-inch PYREX brand glass pipe transports the juice of the grape in every step of the wine-making process. And even the original lines look and perform like new. If, using other pipe, Taylor had had to replace the layout *just once* in that time, think of the money they have saved with PYREX pipe.



PYREX pipelines from storage to filters in Taylor Wine Company's plant.

A new kind of "insight"

PYREX pipe is transparent. You see what's inside the line. You're sure the right fluid is going to the right filter, mixer, kettle or filling machine. You *see* when lines need cleaning —and the instant they are clean.

Speaking of cleaning, Taylor's system is typical of the easy method employed by processors of many foods—from top quality wines to maple syrup to mustard. Taylor runs a hot solution of alkaline cleaner through, then rinses with clear, cold water. Lines sparkle. They clean in place. No down time; no tearing down.

Is your plant large enough?

Any plant where corrosive solutions require the replacement of even one line periodically can use PYREX pipe and save. It *never* wears out.

Who installs it?

Whoever does your regular pipeline plumbing can install PYREX piping . . . even if they've never seen glass pipe before. Installation is actually simpler than for many other kinds of pipe. In fact, pipe fitters frequently tell us working with PYREX piping is a pleasure compared with other materials.

A bottling station . . . showing part of Taylor Wine's 1½-mile PYREX pipe system.

You can buy standard fittings (tees, elbows, spacers, and other PYREX units) to complete any kind of layout design. PYREX pipe comes in 1", 1½", 2", 3", 4" and 6" sizes.

What does it cost?

PYREX brand glass pipe is actually the lowest cost, corrosion resistant pipe you can use. Initial cost is favorable. Long service life, low maintenance and no replacement all add savings.

Next Step

We have helpful bulletins telling you more about PYREX pipe in the food processing plants. We'd like you to have free copies. Write or call us for these or just use the coupon below for prompt action on our part.

CORNING GLASS WORKS

Corning means research in Glass

CORNING GLASS WORKS, 51 Crystal Street, Corning, N. Y.

Please send me the printed information checked below:

- ☐ Bulletin EA-1: "PYREX pipe in the Process Industries."
- ☐ Bulletin EA-3: Catalog of PYREX pipe and fittings.
- ☐ Bulletin PE-3: "PYREX pipe installation manual."

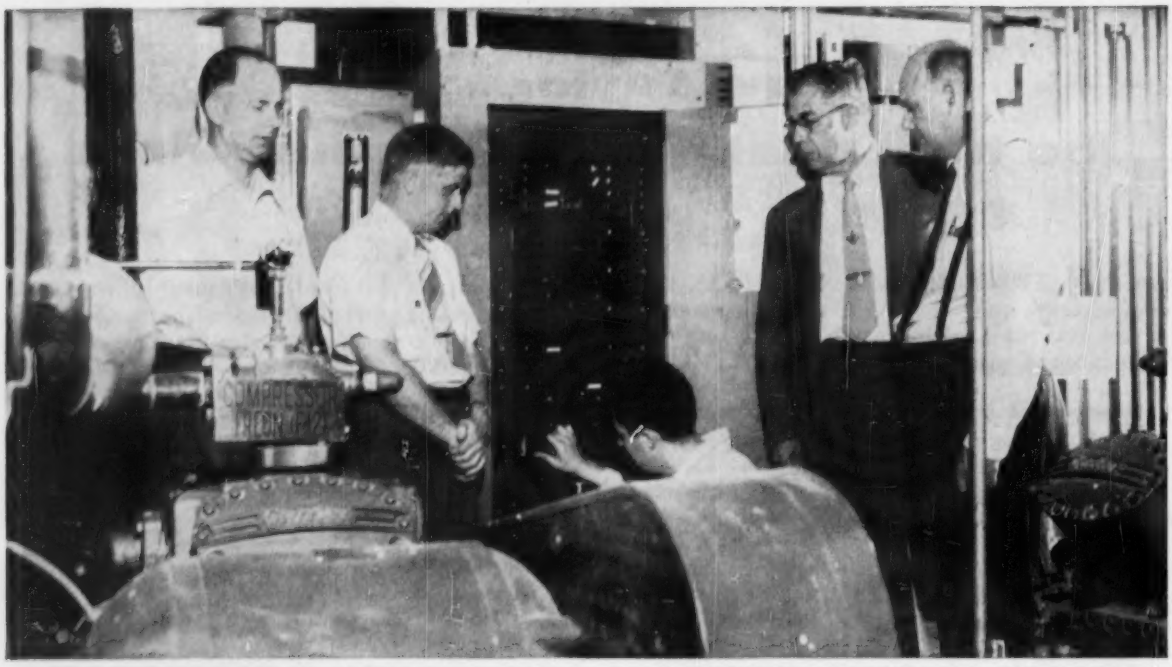
Name ..... Title .....

Company .....

Address .....

City ..... Zone ..... State .....

For more information, use coupon on last page.

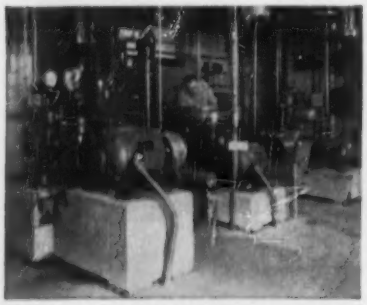


Leonard F. Patridge (2nd from left), Arnold Engineering Director, watches as operation of the new bread-freezing and storage plant begins.

Director of Engineering tells:

Why Arnold Bakers chose "Freon"* refrigerants for their new bread-freezing plant

Worker checks bread in the quick-freezing room at Arnold Bakers' plant in Port Chester, New York.



Both the Fuller rotary compressor (left) used as a "booster" unit and the Carrier reciprocating unit are charged with "Freon-12" dichlorodifluoromethane.

Shipping frozen bread over long distances opened up vast new markets for Arnold Bakers' premium bread. We asked Arnold's Director of Engineering, Leonard F. Patridge, why equipment charged with "Freon" refrigerants was selected to do the job. We couldn't put the reasons more strongly than he did:

"If we had any other refrigerant than 'Freon,' we would chance ruining our product, injuring our employees and going out of the frozen-food business."

Mr. Patridge explained by pointing out two advantages of "Freon"—advantages vital in cooling or freezing food. "It has no odor, and it is practically nontoxic. We can't take any chances of contaminating our products. One loaf of bread or one roll with an off taste or odor would ruin our reputation. So we absolutely need 'Freon.'"

"Freon" refrigerants also help keep temperatures precisely controlled in Arnold's quick-freezing room. Despite constant opening of doors to remove frozen bread, and despite the warmth of unfrozen bread put in its place, "Freon" refrigerants keep temperatures close to the ideal −20°F. Mr. Patridge wants.

Mr. Patridge is one of many enthusiastic friends won by "Freon" in the food-refrigeration field. These men want a refrigerant that's nonflammable, nonexplosive, practically nontoxic . . . one that's free of acids and won't corrode equipment. They absolutely *need* a refrigerant that's free of odors. No wonder they specify "Freon"—*the proven standard of the refrigeration industry!*

Whether you need refrigeration and air conditioning for a huge plant or a small unit for a specific job, your equipment will serve you better if it's charged with "Freon." Write for full information to E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Division, Wilmington 98, Delaware.

Here's how Arnold Bakers use refrigeration with safe, dependable "Freon" refrigerants

1,000 POUNDS PER HOUR is the capacity of the quick-freezing room. A rack load of fresh-from-the-oven bread takes about 45 minutes to freeze. At all times the bread is safe, thanks to safe, odor-free Du Pont "Freon" refrigerants.

IN A MATTER OF MINUTES bread passes through the packaging room, where men carton the loaves. Working comfort sets the temperature here at 50°F. Quick handling prevents the bread from thawing and losing the aroma "locked in" by the quick freezing.

DESPITE CONSTANT OPENING and closing of the doors to bring in or take out bread, temperatures in the storage room must be held close to 0°F. Mr. Patridge, Director of Engineering, Arnold Bakers, Inc., credits efficient units charged with "Freon" refrigerants for making this an easy job.

COLD ON THE ROAD is maintained by a truck freezer charged with "Freon-12." It will keep the bread at 0°F. all the way to Miami. Imagination like this has widened the market for Arnold's premium baked goods.

KINETIC

FREON

SAFE REFRIGERANTS

*"Freon" is Du Pont's registered trade-mark for its fluorinated hydrocarbon refrigerants

DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

For more information, use coupon on last page.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

New B. F. Goodrich belt good for 85% of all food-handling jobs

HERE'S the most useful conveyor belt made for the food industry. It's the B. F. Goodrich Highseal, built to handle 85 out of every 100 food-handling jobs, and last longer doing them.

The attractive green color is the first thing you notice about this belt. Lighting experts and color specialists call it "sight-saving" green. By reducing glare and eyestrain, the belt literally eliminates headaches on inspection lines.

A new rubber compound gives this B. F. Goodrich belt good resistance to food acids, most greases, fats and alkalies. It can handle cold products down to zero, as well as hot ones up to 212°.

Food particles can't grind into Highseal's smooth, polished surface. That's why it's so easy to clean. Oily foods, sticky icings, even scuff marks from banging pans, wipe right off with a damp cloth.

For those jobs where oil and grease are not a problem, the B. F. Goodrich Kleenseal is the belt to use. It costs less than the oil-resisting Highseal belt, yet has the same green color and all the other advantages.

It will pay you to find out more about these work-saving, money-saving improvements in food-handling belts. Have a BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. *The B. F. Goodrich Company, Dept M-354, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

"People often are hoggish about paper towels."

WITHOUT realizing it they'll use from two to four single fold towels just for drying.

— wasting as much as 40 inches of paper toweling.

But you can control this waste.

With savings up to 40%!

How?

By installing WESTROLL TOWELS in West Micromatic Cabinets.*

PEOPLE quickly unroll as little or as much as they want. But without realizing it they take less. Averaging 17 inches of soft, absorbent WESTROLL.

Saves janitors' time, too.

— one filling of the tamper-proof cabinet equals four of a single fold towel dispenser.

— there's less litter to clean up.

And washrooms are cleaner, neater.

LET a West representative tell you more about WESTROLL economies. Or send for our WESTROLL folder.

**Cabinets are loaned.*

OLDEST AND LARGEST COMPANY OF ITS KIND IN THE WORLD

WEST DISINFECTING Company

WEST DISINFECTING COMPANY Dept. 8

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☐ I'd like a FREE copy of your folder on cutting towel costs with WESTROLL.

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Name _____

Position _____

(Tear out this coupon and mail it with your letterhead)

For more information, use coupon on last page.

Check 2 New Griffith Antioxidants for

More Oxidative Stability For More Foods At Low Cost . . . . . .

Compare the Performance of these Formulas with that of Any other Antioxidant

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Fish • Chicken
Peanut Oil • Olive
and other Vegetable Oils • Citrus Fruit Flavors and Essential Oils

	"G-15"	"G-16"
Highly effective in retarding oxidation for long period in low concentration	YES—Contains Propyl Gallate	YES—Contains Propyl Gallate
Excellent "carry-through" stability after exposure to high (baking) temperatures	YES—Contains BHT and BHA	YES—Contains BHT and BHA
Non-toxic	YES	YES
Imparts no flavor, odor, or color	YES	YES
Develops no flavor, odor, or color during its stabilizing life	YES	YES
Doesn't cause metal-reactive discoloration of product	YES—Contains Patented* Lecithin-Citrate	YES—Contains Monoglyceride-Citrate
Oil-soluble	YES	YES
Water-soluble	—	YES
Reasonable in cost	YES	YES
Packed in convenient non-returnable drums	YES	YES

We'll be glad to consult with you in selecting the proper antioxidant for most effective and economical stabilization of your products. Write us.

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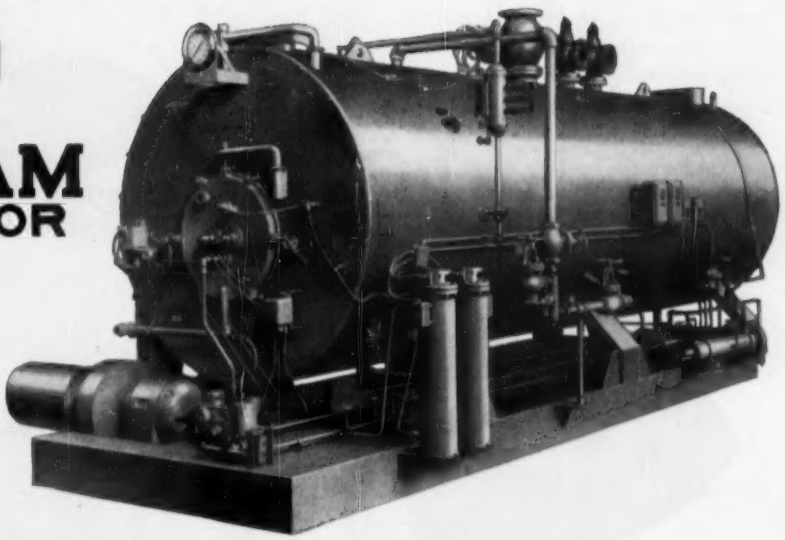
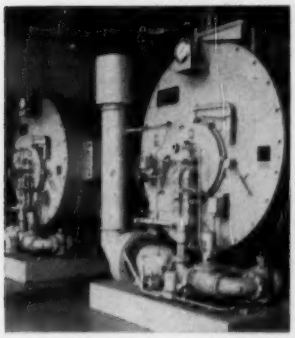
GET ALL THESE ADVANTAGES

WITH AN AMESTEAM GENERATOR



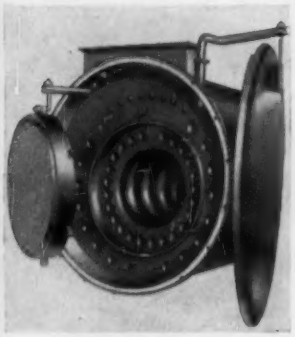
For:
PROCESSING
HEAT — POWER

20 sizes, 10 to 600 H.P., 15 to 200# W.P., oil, gas or oil-gas combinations with quick fuel switchover feature.



FULLY ASSEMBLED

All piping, wiring and operating parts completely assembled and tested at factory — units shipped in ready-to-fire condition!



EASY TO CLEAN

Ames-designed davit hinged flue covers and baffle provide quick and complete access to the furnace and all tubes.

SAVINGS IN FIRST COST!

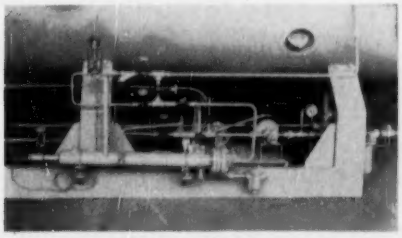
Your purchase price includes complete unit — no hidden "extras" to buy later on!

SAVINGS AT INSTALLATIONS

Just set on level concrete floor, connect to service lines and breeching. Nothing to assemble. No brick work required.

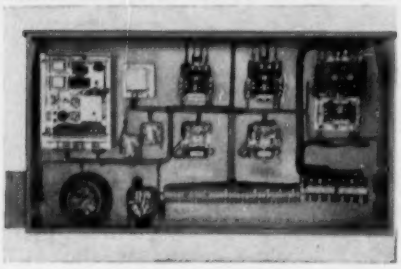
SAVINGS IN OPERATION

A minimum of supervision — lower manhour requirements for maintenance — easily replaced inexpensive plastic refractories — 80% thermal efficiency.



AMPLE ROOM

underneath for servicing auxiliary equipment. Control panel at eye level.



AUTOMATIC

operation, fully safeguarded, is provided by factory installed and tested control system.

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AMES IRON WORKS, INC.
Oswego, N. Y., Box B-15

Gentlemen:

Please send me further information on AMESTEAM GENERATORS and name of nearest representative.

NAME .....

COMPANY .....

ADDRESS .....

AMES IRON WORKS INC.

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Be your own Fortune Teller... in one easy lesson

It doesn't take much experting to forecast the competitive edge that Allegheny Metal can give you.

If you're one who'd use stainless steel in plant or processing equipment, its ease of cleaning, low maintenance and long life can cut production costs and raise your quality standards. If you use it in a product, the matchless strength, high corrosion resistance, wear resistance and perennial beauty of stainless steel can give you a bale of extra value to sell.

Either way, you'll have something going for you when the chips are down. ● *Now's* the time to start Allegheny Metal working for you, and we're ready to help every possible way. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

Make it BETTER-and LONGER LASTING-with

Allegheny Metal

AL® TIME-TESTED STAINLESS STEEL

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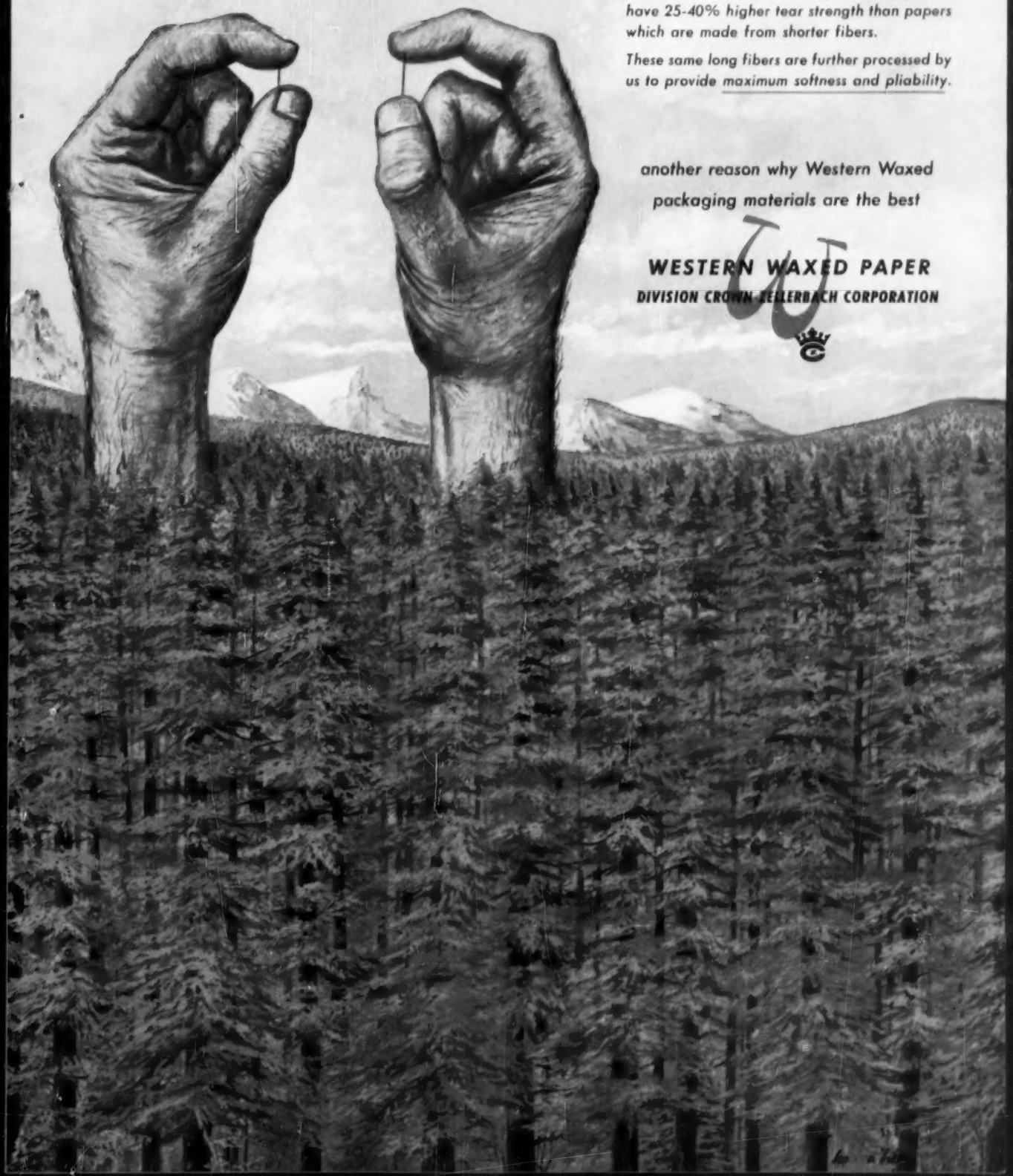
Warehouse stocks carried by all Ryerson steel plants

NATURE GIVES US A HAND



Mother nature has provided us with the largest source of Western long fiber paper pulp from Crown Zellerbach's tree farms.

These long fibers are used exclusively in all our packaging papers to provide the toughest wrappers. Laboratory tests and actual customer use prove that Western Waxed packaging papers have 25-40% higher tear strength than papers which are made from shorter fibers.

These same long fibers are further processed by us to provide maximum softness and pliability.

another reason why Western Waxed packaging materials are the best

WESTERN WAXED PAPER

DIVISION CROWN-ZELLERBACH CORPORATION

SEE MOYNO PUMPS AT BOOTH #107
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CONRAD HILTON, CHICAGO, FEB. 19 TO 23

"So it PUMPS CHOW MEIN

what does that have to do with my pumping problem?"

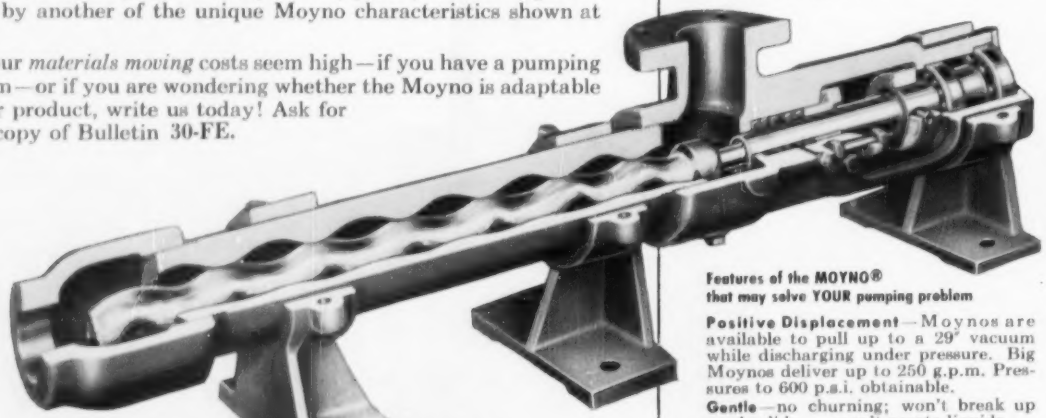
Plenty! That is, if the material you handle, like chow mein, *will go through a pipe.* If it will, the amazing Moyno Pump may be just what you are looking for!

This pump is *different*, without being a prima donna. It is *new*, yet thoroughly service-proved for liquids, pastes, solids in suspension, abrasive-laden slurries, and a long list of other applications.

Perhaps, like the chow mein producer, you need to handle materials smoothly, without squeezing. The answer is *progressing cavities*—found only in the Moyno. Or, your problem might be solved by another of the unique Moyno characteristics shown at right.

If your *materials moving* costs seem high—if you have a pumping problem—or if you are wondering whether the Moyno is adaptable to your product, write us today! Ask for a free copy of Bulletin 30-FE.

About the chow mein application: **ladling proved to be too slow and expensive. Ordinary pumps made soup out of the celery. Moynos work perfectly; cost ⅓ less!**



Features of the MOYNO® that may solve YOUR pumping problem

Positive Displacement—Moynos are available to pull up to a 29" vacuum while discharging under pressure. Big Moynos deliver up to 250 g.p.m. Pressures to 600 p.s.i. obtainable.

Gentle—no churning; won't break up semi-solids . . . won't aerate liquids.

Reversible—pumps with equal efficiency in either direction.

Trouble-Free—self priming; won't cavitate or vapor-lock. Just one moving part—no valves to stick, no pistons to gum up. Built for tough service. Easy to maintain.

Versatile—adaptable to washers, drink dispensers, gasoline pumps, oil burners, etc.—or can be custom-designed to meet your requirements.

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Fractional & Integral H.P. Motors & Generators | Moyno Pumps | Propellair Industrial Ventilating Equipment | Electric Fans | Electric & Hand Hoists & Cranes

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Pep up the flavor of compound coatings with Monsanto Ethavan and Vanillin

To put new zest into your hard butter coatings try Monsanto Ethavan or Vanillin. They are particularly important because hard butter coatings absorb more flavor than older-type cocoa butter coatings.

Better still, Monsanto Ethavan and Vanillin have high "staying power," retain their flavor during hot processing.

Monsanto Ethavan and Vanillin come to you in the form of pure, fine crystals and can be added to a compound without diluting or lowering the viscosity.

Next time, add either of these two fine products to your formulation or specify them to your flavor supplier.

For more information on the use of these ingredients in compound coatings, call the Monsanto office near you, or write: Organic Chemicals Division, MONSANTO CHEMICAL COMPANY, Box 478-A, St. Louis 1, Missouri.

Ethavan: Reg. U. S. Pat. Off.

MONSANTO

SERVING INDUSTRY, WHICH SERVES MANKIND

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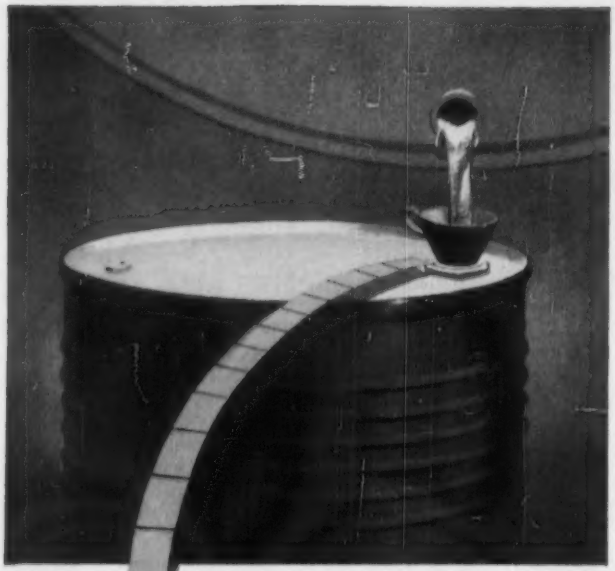
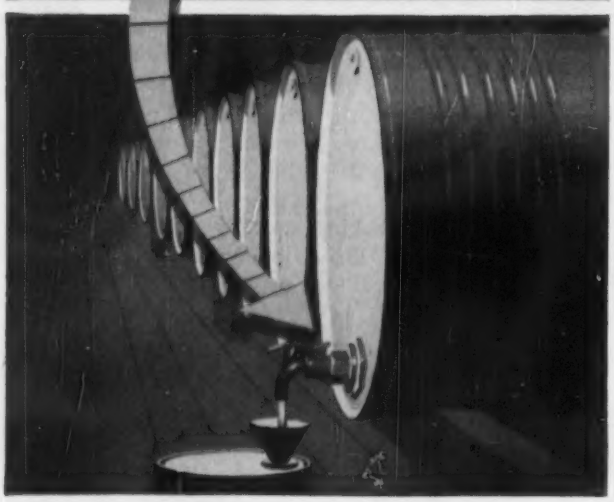
Do you go all the way with quality control?





AFTER so carefully maintaining the highest possible standards of quality during the manufacture of your products, it will pay you to protect that product quality during *shipping*, too. USS scale-free, rust-inhibited Drums will *keep* your products clean and uncontaminated. There is no grease, dirt or scale in a USS Steel Drum to affect its contents. A surface absolutely clean—physically and chemically—is covered with a tightly adherent, truly effective rust-inhibiting coating.

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. . .

United States Steel Products fabricates stainless, galvanized, tinned, painted and decorated drums and pails. Furnished in capacities from 2½ to 110 gallons, with a variety of fittings and openings to fit your particular requirements.

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For additional information on this quality steel drum write to us at New York for this full-color brochure, "USS Drums—100% Scale-free and Rust-inhibited."

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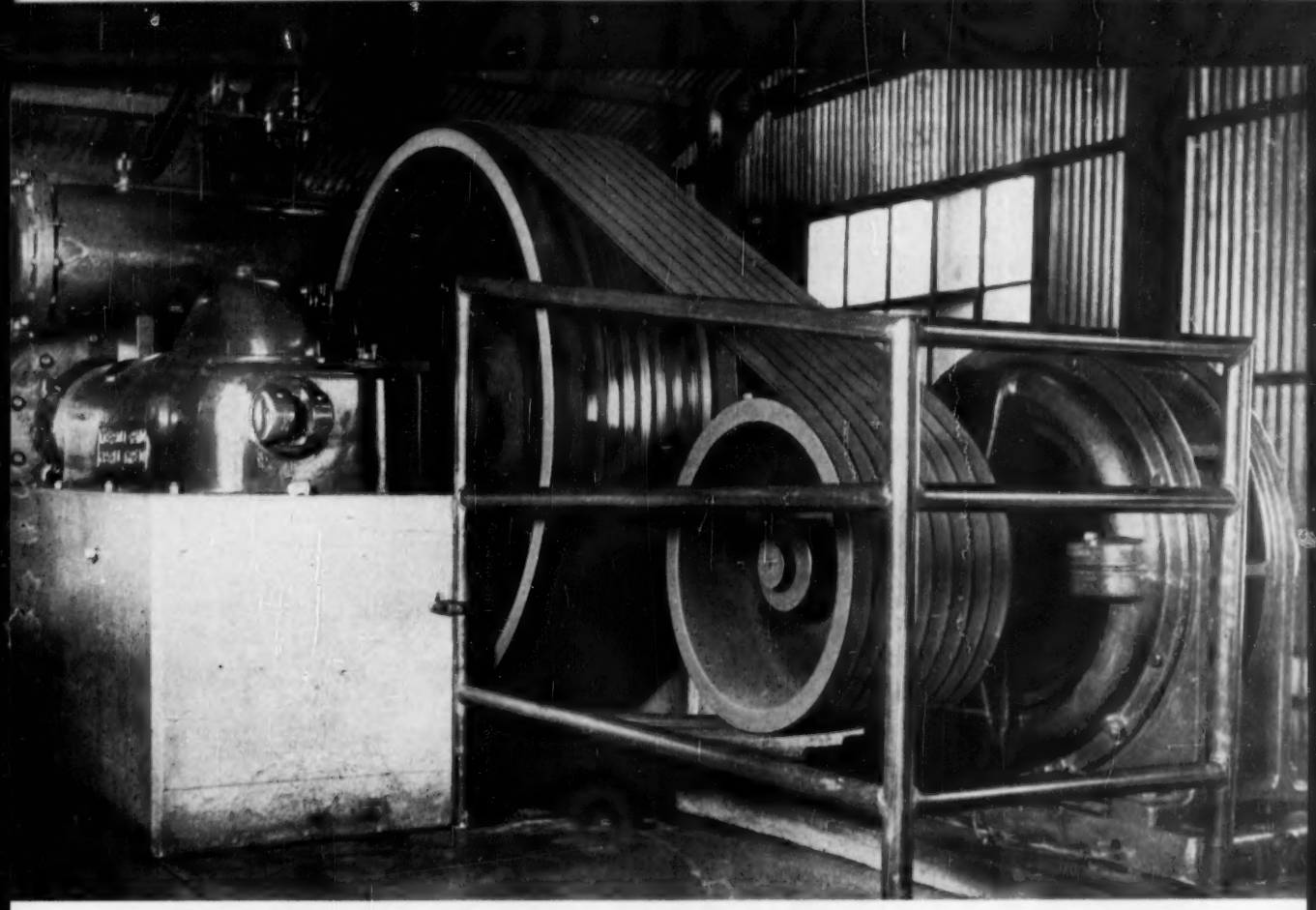
USS STEEL DRUMS

USS

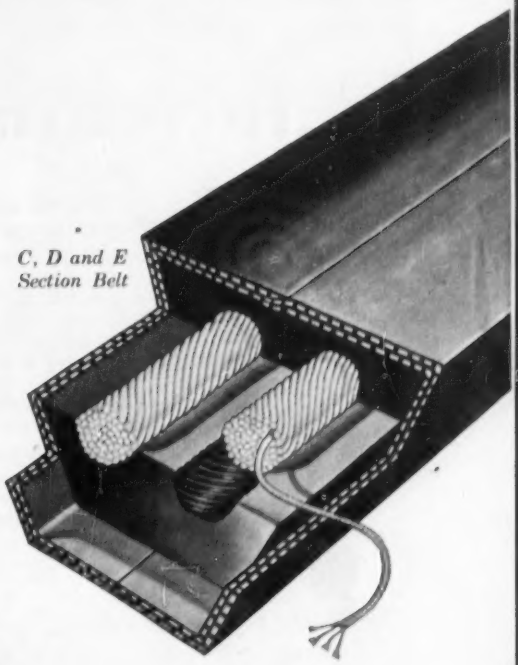
UNITED STATES STEEL



Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every plant application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of any plant service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



C, D and E Section Belt

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

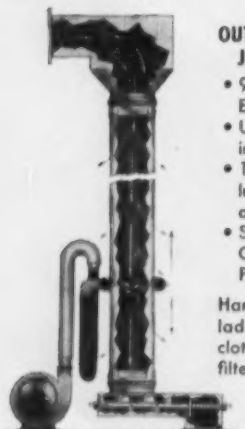
Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

50 Years have changed a lot of things!

...including DUST CONTROL



Licensed by H. J. Hersey, Jr.

Diagram of operating design of filter tube.
(Available in multiples of 4, 8, 12, 16 and 32 tubes)

OUTSTANDING DAY REVERSE JET FILTER ADVANTAGES

- 99.99+% Filtering Efficiency
- Up to 5 Times Higher Filtering Rates
- 100 per cent of Equipment Investment Is in Operation at All Times
- Smaller Size with Higher Capacity Saves Valuable Plant Space

Handles 5 times more dust laden air per square foot of cloth than conventional dust filters.

The automobile has changed America's living habits and the DAY High Pressure Reverse Jet Filter has changed American industries' dust control methods. To match the challenge of changing times and changing needs DAY leadership revolutionized the control of dust by utilizing the Hersey principle of filter cloth cleaning with HIGH PRESSURE REVERSE JET AIR. This advanced type of filter handles FIVE TIMES MORE DUST LADEN AIR per square foot of filter cloth than conventional filters. This is the most important improvement in dust filtering in 50 years.

Modern manufacturing methods demand modern dust control methods. There is nothing that will match the high on-the-job efficiency provided by DAY filters. It is a proven fact that one DAY filter recommends another. DAY High Pressure Reverse Jet filtering has been used by leading companies for more than 5 years. 87% of DAY filter users have ordered additional DAY Reverse Jet Filters. For maximum filtering results from a minimum filter investment write for complete facts. DAY gives you tremendous savings in valuable plant space, installation and maintenance costs.

Write toDAY for FREE Bulletin 528-R, about America's most advanced dust filter.

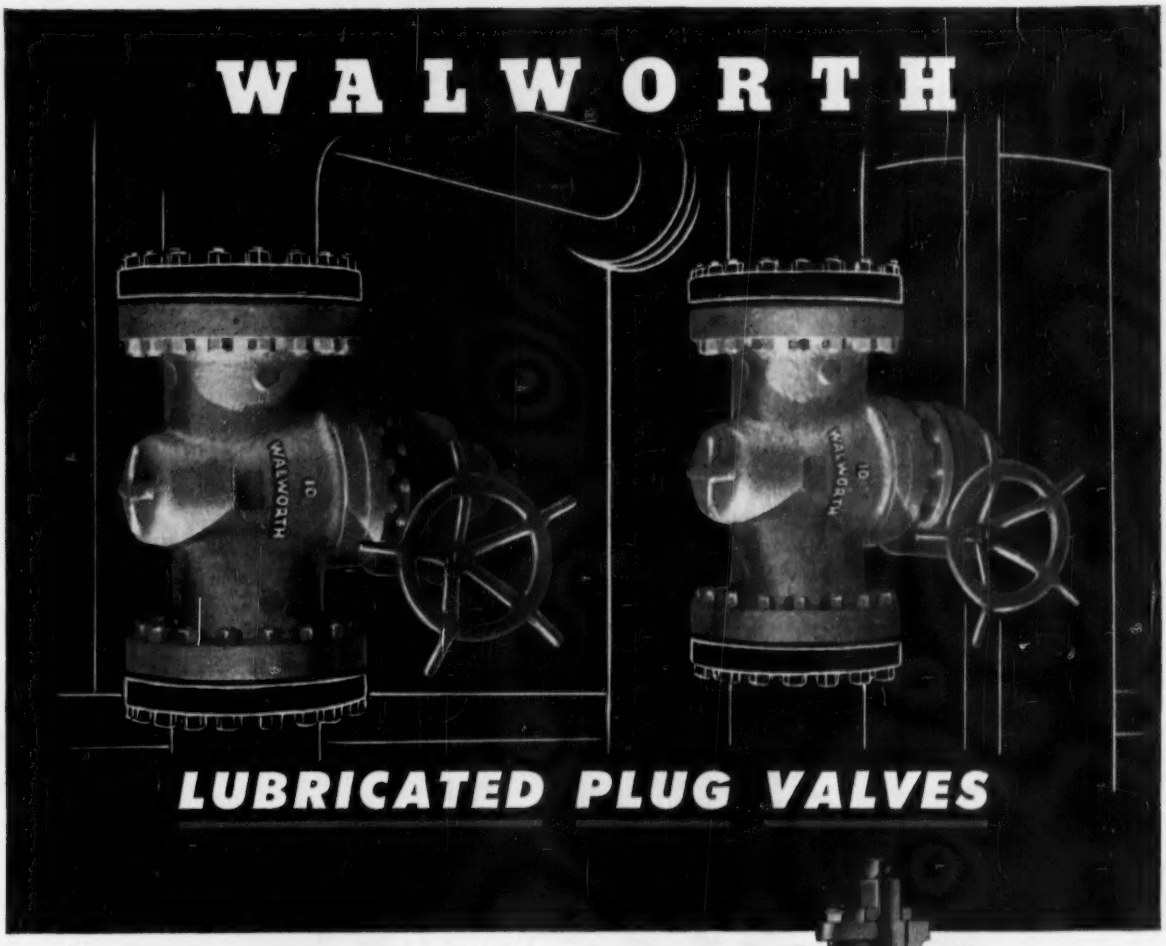
DAY SINCE 1881

The DAY Company

817 Third Ave. N. E. • Minneapolis, Minnesota
IN CANADA: P.O. Box 70D, Ft. William, Ontario
Branch Plants: Buffalo, Ft. Worth and Toronto, Ontario
Representatives in Principal Cities

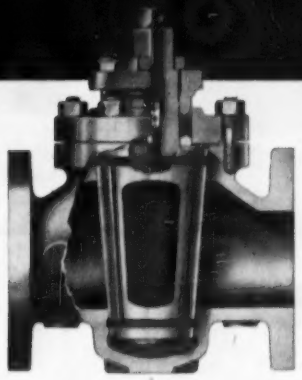
STOP AIR POLLUTION with DAY DUST CONTROL

WALWORTH



LUBRICATED PLUG VALVES

Better because ... **They are *pressure sealed* with an insoluble lubricant readily renewed while the valve is in service. Lubricant completely surrounds the plug ports assuring a tight seal against leaks. It also insures ease of operation by reducing friction between the body and the plug while at the same time protecting the finished surfaces against corrosion and wear.**



Lubricant system of a Walworth No. 1700F Regular Gland, Wrench Operated, Steel-iron, *Lubricated Plug* Valve. Other Walworth *Lubricated Plug* Valves include Single Gland, and Ball Bearing types. Sizes to 30-inches — pressures to 5,000 psi, and for vacuum service.

Walworth Lubricated Plug Valves are the most satisfactory valves available for the handling of gritty suspensions, and many other destructive, erosive, and corrosive industrial and chemical solutions.

They are ideal for general refinery and pipeline service.

For full information see your Walworth Distributor, or write for your copy of Bulletin 111. Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

For more information, use coupon on last page.

YOU COULD HOOK 'EM WITH THIS...

BUT THIS'LL KEEP 'EM HOOKED!

A sparkling aluminum foil package not only *attracts* new customers—it helps keep them coming back for more!

That's because aluminum foil protects the quality of food products as no ordinary packaging material can. Non-porous foil seals in freshness. Imparts no flavor. Reflects heat and light. Indefinitely keeps out moisture and air—thus prolongs shelf life, and permits distribution over greater distances to profitable new markets.

Flexible in production, foil is pliable, easy to handle, easy to print on. Takes economical and reliable heat seal. Can be printed, colored, coated, embossed, combined with other materials. Superior cold transfer characteristics for frozen foods.

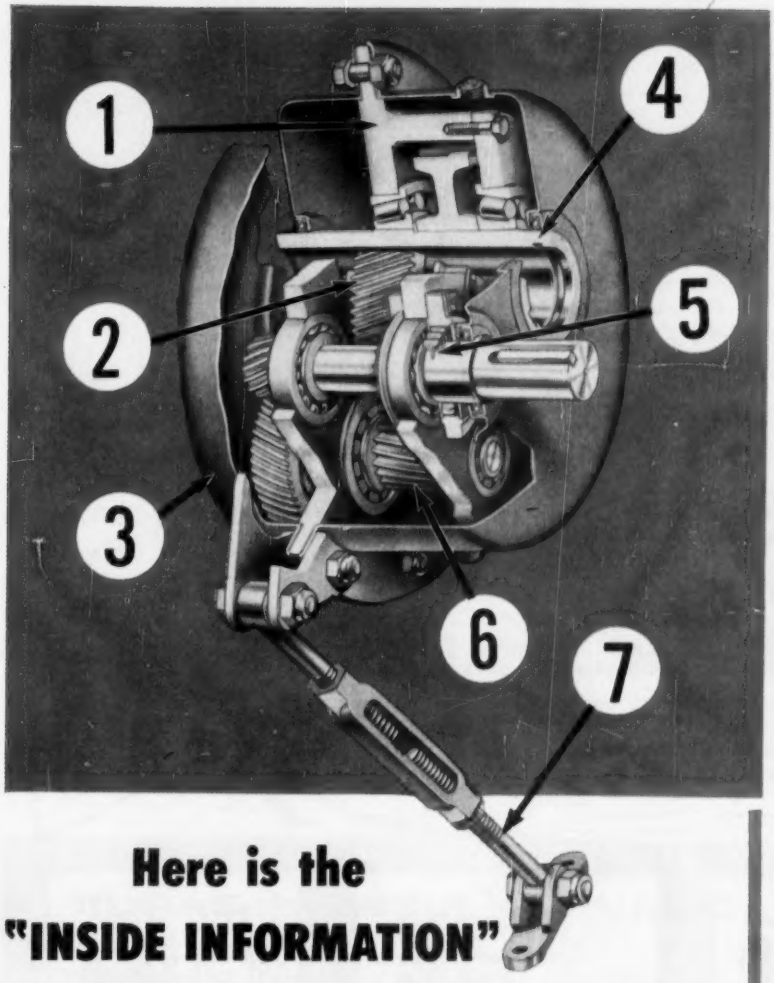
Let aluminum foil's unique combination of sales appeal and quality protection give your sales a boost—as it is doing for more and more progressive food processors.

We don't make packages, but ... there are many leading converters eager and qualified to tackle your packaging problem with you. These converters rely on Kaiser Aluminum as a major supplier because we are an integrated operation, producing foil of unsurpassed quality in a wide range of specifications. Our Engineering Staff is available to work closely with converters and with you.

For names of leading converters contact the Kaiser Aluminum sales offices listed in your telephone directory, or Kaiser Aluminum & Chemical Sales, Inc. *General Sales Office*, Palmolive Bldg., Chicago 11, Ill.; *Executive Sales Office*, Kaiser Bldg., Oakland 12, Calif.

Kaiser Aluminum

setting the pace—in growth, quality and service



Here is the "INSIDE INFORMATION" on FALK ALL-STEEL Shaft Mounted Drives

Take a careful look inside the Falk all-steel Shaft Mounted Drive, and you will know why this newest member of the famous Falk family is ideal for applications where direct mounting on the driven shaft is desirable. It is the only drive in its field with all these superior "In-built" factors:—

1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

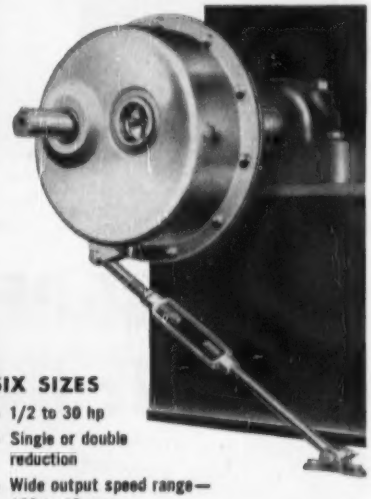
5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

Write to Department 247 for engineering bulletin, including selection and dimension details.

EFFICIENT SPEED REDUCTION IN LIMITED SPACE

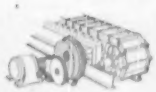


SIX SIZES

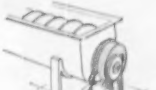
- 1/2 to 30 hp
- Single or double reduction
- Wide output speed range—420 to 10 rpm

Expressly designed for topflight performance on installations requiring considerable speed reduction in limited space, the all-steel FALK Shaft Mounted Drive has quickly won acceptance throughout industry. This sturdy, compact, versatile reducing unit is an ingenious variation of the highly successful FALK Motoreducer design, pacemaker in its field for more than 20 years. Here, the time-proved design is adapted for mounting directly on the shaft to be driven, using V-belt connection to motor. Investigate now!

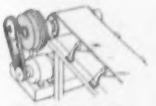
A FEW TYPICAL APPLICATIONS

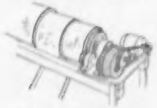

APRON FEEDER

LINE SHAFTING


SCREW CONVEYOR

BUCKET ELEVATOR


BELT CONVEYOR


GRAVEL CLASSIFIER

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

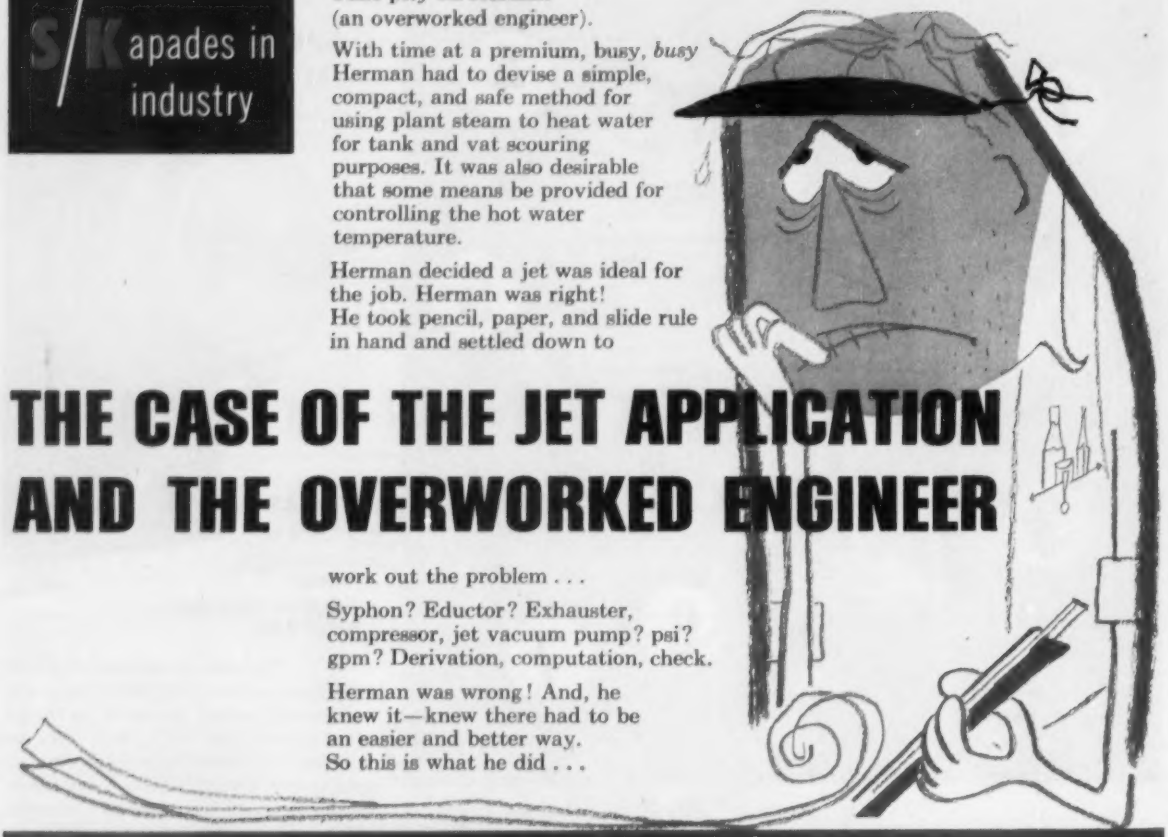
For more information, use coupon on last page.

S/K apades in industry

Take pity on Herman
(an overworked engineer).

With time at a premium, busy, *busy* Herman had to devise a simple, compact, and safe method for using plant steam to heat water for tank and vat scouring purposes. It was also desirable that some means be provided for controlling the hot water temperature.

Herman decided a jet was ideal for the job. Herman was right!
He took pencil, paper, and slide rule in hand and settled down to



THE CASE OF THE JET APPLICATION AND THE OVERWORKED ENGINEER

work out the problem . . .

Syphon? Eductor? Exhauster, compressor, jet vacuum pump? psi? gpm? Derivation, computation, check.

Herman was wrong! And, he knew it—knew there had to be an easier and better way.
So this is what he did . . .

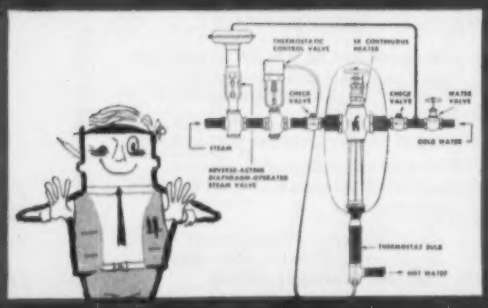
Sent to Schutte and Koerting Company for a copy of new bulletin J-1 on "Jet Apparatus and Its Industrial Applications." Found out what he needed to know about the characteristics, varieties, and ranges of Jet Apparatus.

Learned the nominal required and the types of jets suitable for such a function. Identified the type most suitable for his particular requirements.

Called for a specialist—the nearest SK Sales Engineer—who gave him a specific recommendation.

SOLVED THE PROBLEM EASILY!

The SK Fig. 320 Steam Jet Continuous Heater shown at right mixes steam with cold water to provide hot water. A thermostatic control valve emits the amount of steam admitted and thus controls the temperature of the hot water. A reverse-acting, diaphragm-operated steam valve prevents steam from discharging before the water valve opens or after it closes.

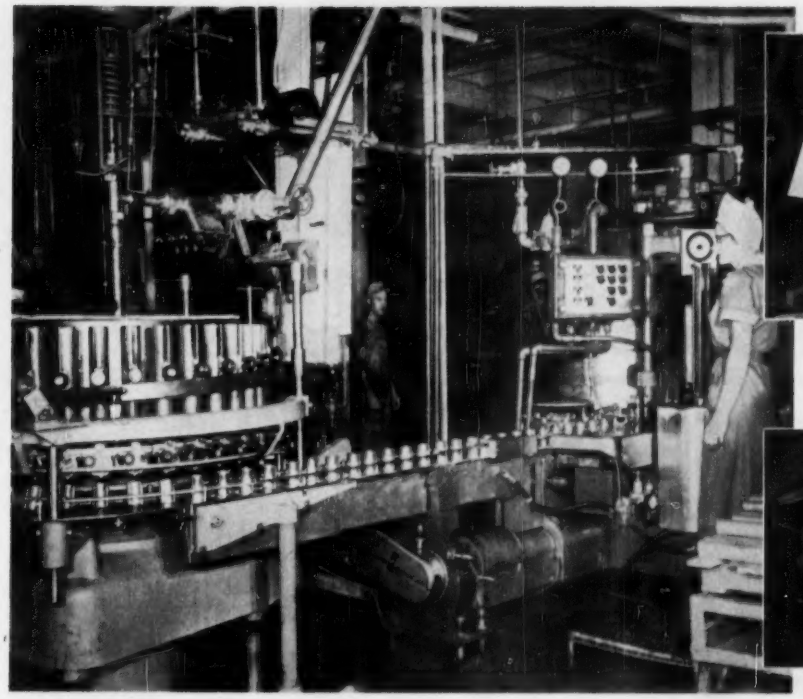


Moral! Request a copy of Bulletin J-1 for your files. Make use of a qualified specialist, your nearest SK Sales Engineer.

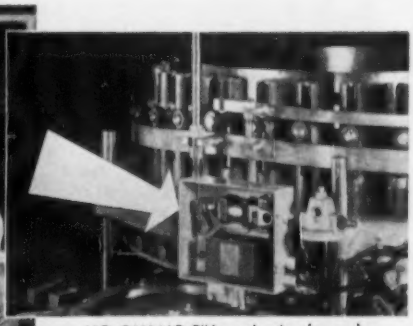
Schutte and Koerting COMPANY
MANUFACTURING ENGINEERS

2223 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

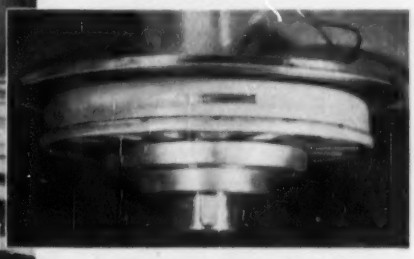
Jet Apparatus • Heat Transfer Equipment
Strainers • Condensers and Vacuum Pumps
Oil Burning Equipment • Rotameters
Flow Indicators • Radiaflo Tubes • Valves
Spray Nozzles and Atomizers • Gear Pumps
Desuperheaters



FASTEST filling machine yet built, first Pfaudler 35 was installed in this Heinz baby food line.



NO-CAN-NO-FILL mechanism (arrow) is electrically controlled, pneumatically activated. Handle at top of machine is used to adjust amount of fill; accurate to ±1/10 oz.



ELECTRIC BRAKE on underside of filler permits split-second stopping.

Another milestone in food packing . . .

New 800-can-a-minute filling machine makes its debut at Heinz Canadian Plant

800 cans of baby food a minute!

That's the story at the H. J. Heinz Co. plant, Leamington, Ontario, Canada, where the first Pfaudler 35 station piston filler earned its wings.

If you package viscous or semi-solid products, you'll be pleased to know that *you* can now enjoy the same high-speed, 800-can-per-minute filling.

To make this speed possible, we've given the new Pfaudler 35 several unique design features—an electric brake that stops the machine within 2/10 of a second; a pneumatic no-can-no-fill mechanism which is electrically controlled; an adjustable track which tilts the speeding cans to the proper angle for filling.

Easy maintenance

You have only three points on the entire machine to lubricate by hand. All gears are immersed in oil and automatic forced lubrication is supplied to all bearings in the base.

One man can clean the machine. There are only two parts for him to remove—the valves and the pistons—and no tools are needed. Liquid seal eliminates piston rings.

This machine accurately fills cans, jars and composition containers up to 16 oz. You can adjust amount of fill precisely, to within ±1/10 oz. in most cases.

Bring high-speed filling into your plant, with the fastest filler in the world. *Mail the coupon today.*

THE PFAUDLER CO.
Dept. FE-1, Rochester 3, N. Y.

Please send full data on the new Pfaudler 35 station piston filler.

Name_____

Company_____

Title_____

Address_____

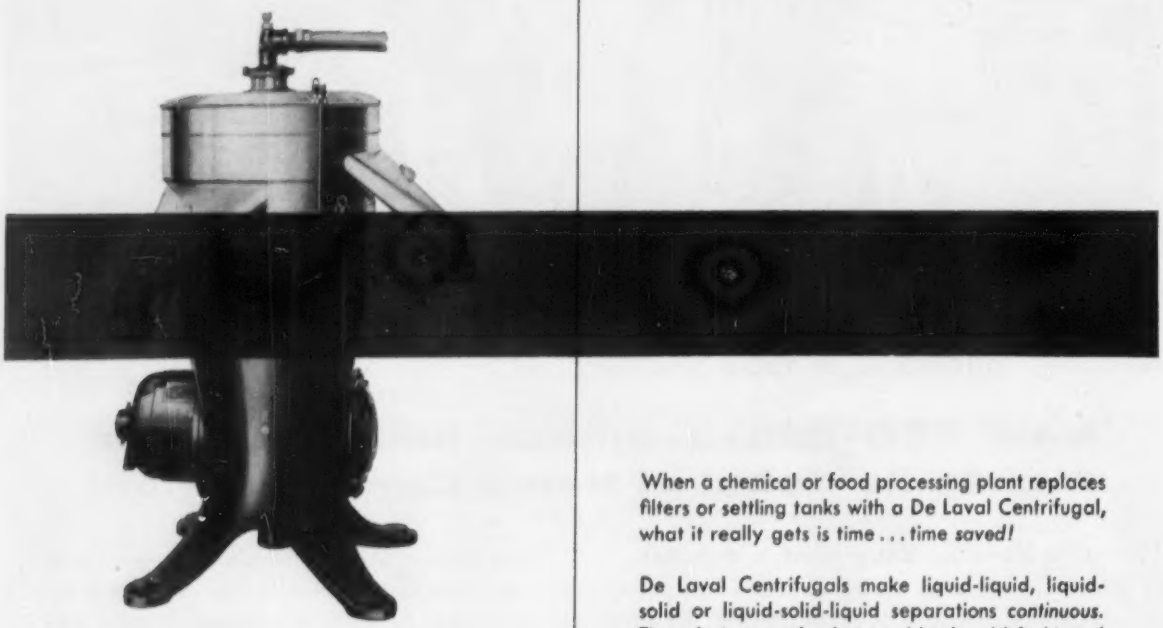
City_____ Zone_____

State_____

THE PFAUDLER CO., ROCHESTER 3, N.Y.

For more information, use coupon on last page.

VALUABLE TIME ...FOR SALE!



When a chemical or food processing plant replaces filters or settling tanks with a De Laval Centrifugal, what it really gets is time . . . time *saved!*

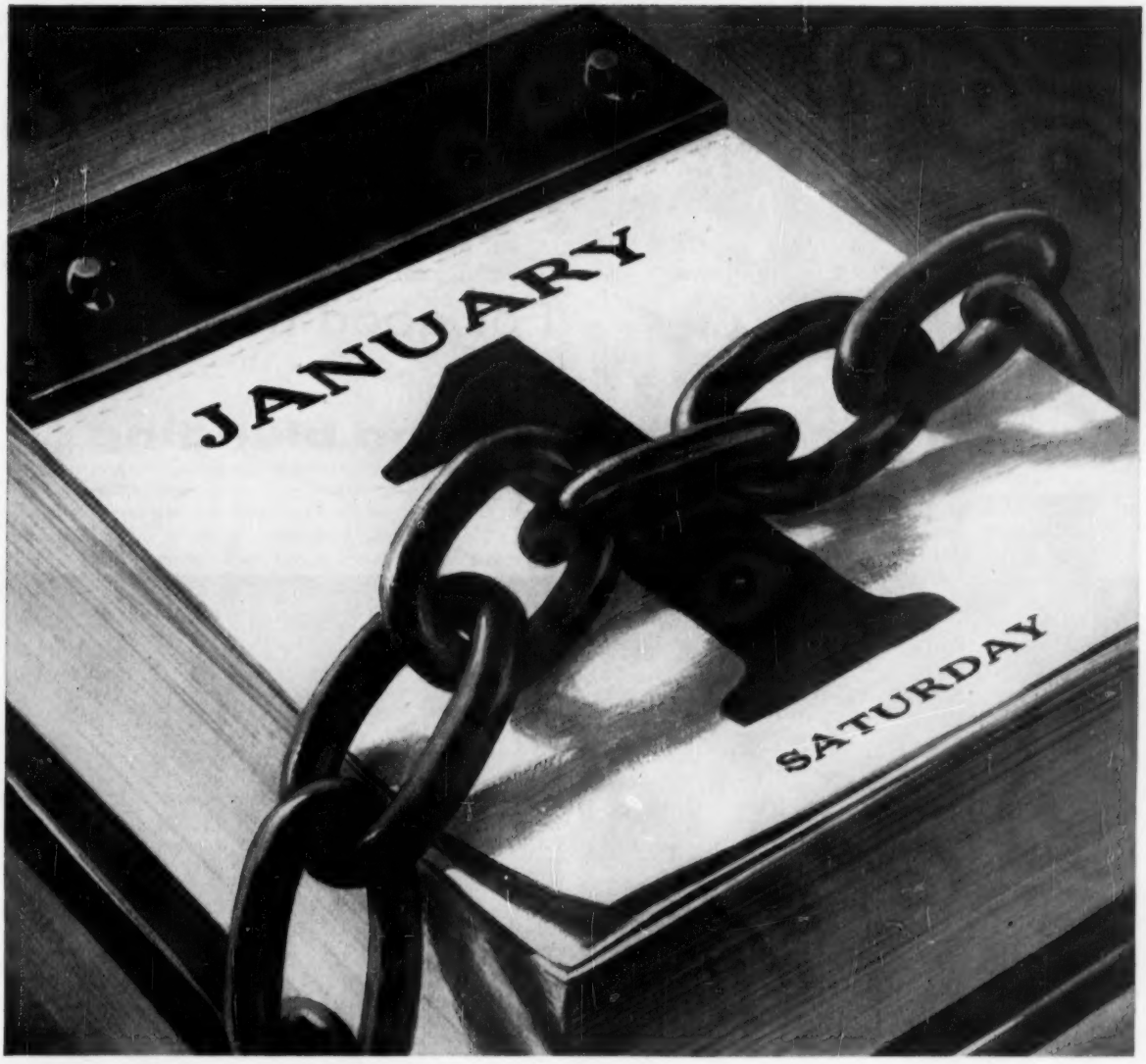
De Laval Centrifugals make liquid-liquid, liquid-solid or liquid-solid-liquid separations *continuous.* They do in *seconds* what would take old-fashioned methods minutes, or even hours—and do it better. They pay for themselves fast, too!

Let us show you, factually, how De Laval Centrifugals have made "stop-and-go" separation, concentration and clarification obsolete in many plants.

DE LAVAL

for faster processing systems

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • **DE LAVAL PACIFIC CO.** 61 Beale St., San Francisco 5



Time stands still inside your package . . .

Does every tick of the clock rob your product of a fractional share of its original goodness?

If your product is painstakingly perfect the day you pack and ship it, will oxidation, moisture or light steal some of that goodness before it reaches the consumer?

Such loss need not occur . . . not in this age of scientific packaging. Today's packaging engineer has dozens of flexible materials to choose from. Each has its own unique protective characteristics. By combining several layers of these materials into a single sheet, Acmeflex allows you to handpick the protective qualities you need.

Acmeflex is available in an almost unlimited range of combinations . . . transparent films, metallic foils, plastic-coated papers, combinations of all three! You specify the protective and visual goals of your packaging, we do the rest. Acmeflex can be printed to your specifications and is delivered on webs for high speed packaging equipment.

ACMEFLEX
SAMPLE BOOK

SEND FOR THE ACMEFLEX CATALOGUE today. It contains samples of typical Acmeflex combinations together with their protective specifications.

ACME BACKING CORPORATION
Meadow and Bogart Streets, Brooklyn 6, N. Y.

ACMEFLEX

The barrier packaging that defies the elements.

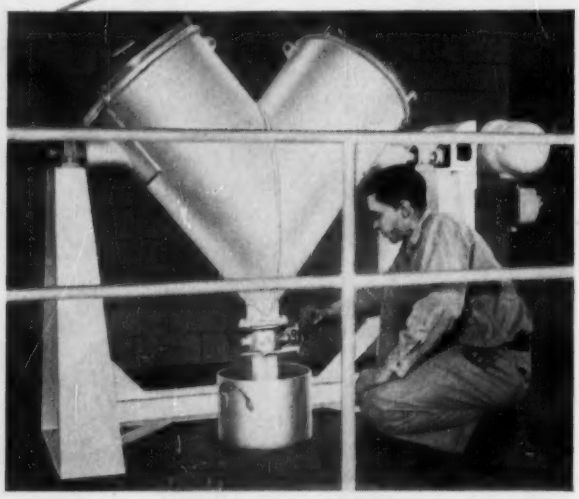
For more information, use coupon on last page.

For good taste

For good health

For good blending

Vitamins
B_1, B_2, Niacin and Iron



Delicious Cream of Rice is a family favorite. Enriched with essential vitamins, it not only tastes good, but is good for you.

Thorough blending of vitamins is, of course, imperative. A **p-k** 5 cu. ft. stainless steel blender*, equipped with intensifier bar*, effectively blends four basic vitamins—niacin, thiamine, riboflavin and iron compound. This is another example where the food industry has selected the **p-k** twin shell blender to precision blend these important vitamins.

Loading is simplified by quick opening, dust-tight covers. Discharge is rapid, too, with the pre-blended vitamins emptied directly into containers for subsequent blending with the rice. Its smooth baffle-free interior facilitates clinical cleaning.

The application of **p-k** twin shell dry blenders to your particular processes will assure efficient blending at low cost. Why not pre-test your materials in **p-k**'s special blending laboratory. Send a sample of your materials for a thorough blending analysis, or write for catalog 12, no obligation.

* patented

the **Patterson-Kelley Co., inc.**
1510 Lackawanna Avenue, East Stroudsburg, Penn.

2527

101 Park Avenue, New York 17 • Railway Exchange Building, Chicago 4 • 1700 Walnut Street, Philadelphia 3 • 96-A Huntington Avenue, Boston 16 • and other principal cities.

They're light... tough... turn on a dime

NEW *Aluminum* small trucks BY WEAR-EVER

You can probably think of a hundred and one cases where our new small truck can help you speed up your operations.

Lighter than many a baby carriage, it rolls easily, turns on a dime, stores in a minimum of room. It's husky, too—made from a special extra hard aluminum alloy that stands up under hard usage, resists dents and gouging.

You'll like its smooth finish and smart appearance. Welds are carefully ground, corners skillfully contoured for easy cleaning. Hard rubber wheels in husky swivel casters are sturdily mounted at each corner.

But take a look. See if this new economical Wear-Ever truck doesn't fill a long-felt need in your plant. Just call your dealer or send us the coupon below for full details.

Trucks also available in 1000 lb. capacities.

The Aluminum Cooking Utensil Company, Inc.,
310 Wear-Ever Bldg., New Kensington, Pa.

☐ Send me your catalog

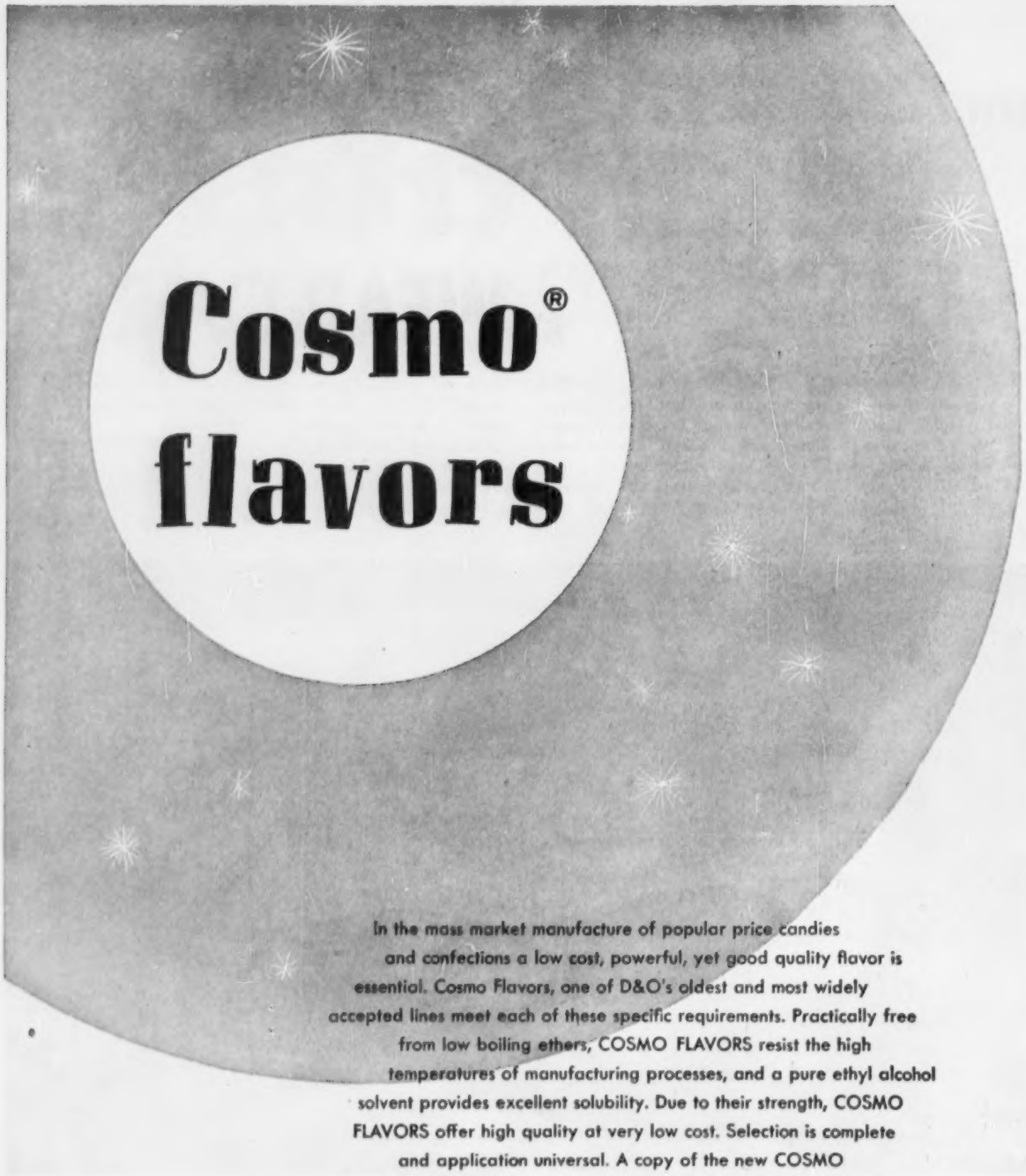
☐ Have representative see me regarding your trucks

NAME _____

TITLE _____

Fill in, clip to your letterhead and mail today

For more information, use coupon on last page.



In the mass market manufacture of popular price candies and confections a low cost, powerful, yet good quality flavor is essential. Cosmo Flavors, one of D&O's oldest and most widely accepted lines meet each of these specific requirements. Practically free from low boiling ethers, COSMO FLAVORS resist the high temperatures of manufacturing processes, and a pure ethyl alcohol solvent provides excellent solubility. Due to their strength, COSMO FLAVORS offer high quality at very low cost. Selection is complete and application universal. A copy of the new COSMO BROCHURE giving listings, formulas and directions for use will be forwarded on request. Consult D&O.

Our 156th Year of Service

D&O ESTABLISHED 1798

DODGE & OLCOTT, INC.

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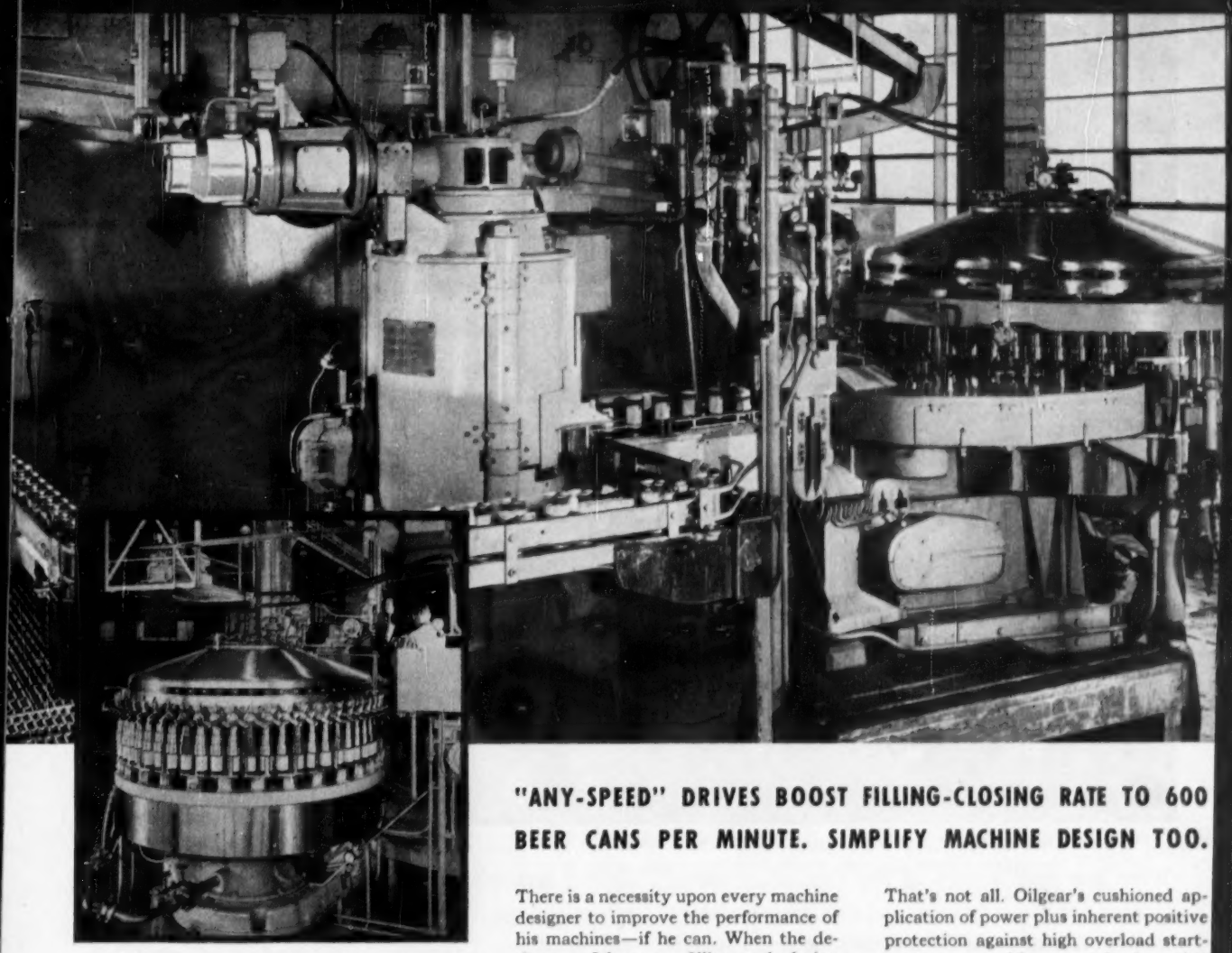
ESSENTIAL OILS • AROMATIC CHEMICALS • PERFUME BASES • FLAVOR BASES • DRY SOLUBLE SEASONINGS

You too can discover
THE WAY UP IS OILGEAR



Beer Can Filling and Closing Machines equipped with Oilgear "ANY-SPEED" Drives are operating in many breweries. With Oilgear, beer can filling and closing production climbed from 360 to 600 cans a minute.

OILGEAR
Fluid Power

PIONEERS...NOW THREE PLANTS FOR FLUID POWER

PUMPS, MOTORS, TRANSMISSIONS, CYLINDERS & VALVES

"ANY-SPEED" DRIVES BOOST FILLING-CLOSING RATE TO 600 BEER CANS PER MINUTE. SIMPLIFY MACHINE DESIGN TOO.

There is a necessity upon every machine designer to improve the performance of his machines—if he can. When the designers of beer-can filling and closing machines raised the rate from 150 to 360 cans per minute, the drive limit seemed to be reached. Yet, their users wanted more production *without spillage* or can conveyor problems.

Then these engineers tried Oilgear "ANY-SPEED" Drives . . . the Fluid Power and Control that gave them what they wanted and—even more.

These engineers stipulated: • accelerate machines to half speed in 2 seconds • accelerate machines to full speed in 5 seconds • decelerate and stop machines in 4/10 seconds • a filling-closing rate of 425 cans per minute.

The Oilgear drive accelerated and decelerated so smoothly, it actually provided: • acceleration to full speed in 2 seconds • deceleration and stop in 2/10 seconds • a filling-closing rate of 600 cans per minute.

That's not all. Oilgear's cushioned application of power plus inherent positive protection against high overload starting torques and lower overload running torques eliminated the need of mechanical slip clutches. Thus, the machine design is simplified and maintenance is negligible.

This smooth yet swift acceleration and deceleration that allows brewers to handle full cans without spilling is one of two tremendously important Oilgear advantages. Utterly variable, flexible and controllable speed is the other. These and other superiorities are writing new history in machine design. *You ought to know the details of that history.* Why don't you contact a nearby Oilgear engineer, or write to Milwaukee. No cost, but the profits may be great.

THE OILGEAR COMPANY

1580 W. Pierce Street

Milwaukee 4, Wisconsin

Clean, Bright *Carpenter* Stainless Tubing Solves Sanitation—Fabrication Problem

When you need a material that's clean and stays clean . . . want a bright material that needs no additional polishing—specify Carpenter Stainless Tubing.

Carpenter Stainless Tubing is a "natural" for the food industry. This manifold for a milking machine is just one example. Its mirror-like finish stays sanitary with a minimum of cleaning difficulties. It will not stain or corrode even in the presence of acids and strong alkalies.

But sanitation is only the beginning of the long list of advantages Carpenter Tubing gives you. It is ductile, easy to work. It is uniform in dimension, concentricity, wall-thickness, hence, minimizes the need for expensive "hand" operations. Physicals and analysis exceed specifications. In short, there *is* a difference in stainless tubing—and *Carpenter* makes it!

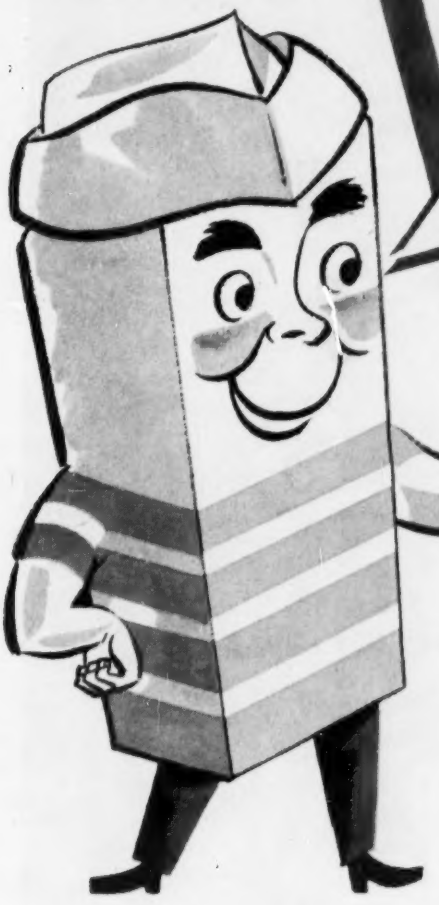
For complete information about Carpenter Stainless Tubing in the analysis, size, quantity you need . . . for engineering or design advice and assistance, 'phone your nearest Carpenter distributor. Or write direct to the mill—no obligation, of course.

The Carpenter Steel Company, Alloy Tube Division, Union, N.J.
Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

MILKY SAYS:



INVESTIGATE A-C* Polyethylene FOR MILK CARTONS!

. . . you can run it in your present coating equipment

Yes, look into A-C POLYETHYLENE, the low-molecular-weight polymer. Its low viscosity lets you blend with your *present* equipment. And although very small percentages are required, you'll get stronger dairy cartons that are more attractive and easier to process.

Look at these *sales* advantages—

- A-C POLYETHYLENE is an easily worked plastic. It strengthens dairy cartons, reduces flaking, helps reduce leakers, extends shelf life. And by effectively combating lactic acid absorption, it minimizes bulging and loss of sales appeal.
- A-C POLYETHYLENE insures better coverage, too. Your cartons get a more uniform, more homogeneous coating on bottom and sides. They can take rougher treatment than conventional dairy cartons.
- Brighter colors, clearer printing, all around brilliance comes with A-C POLYETHYLENE. It's a sure way to add sales appeal to these staple products.

Note these *production* advantages

- A-C POLYETHYLENE is economical to use, and it's easy to handle in your present waxing equipment. Increased mileage may be expected.
- Production runs are better . . . your containers are easier to process because A-C POLYETHYLENE minimizes the accumulation of wax on the filler section runners. Your machine stays clean—there's less maintenance.

It will pay you to ask your wax supplier about A-C POLYETHYLENE. Send in the handy coupon for additional information.

*Trade-mark

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Allied Chemical & Dye Corporation
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Allied Chemical

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For more information, use coupon on last page.

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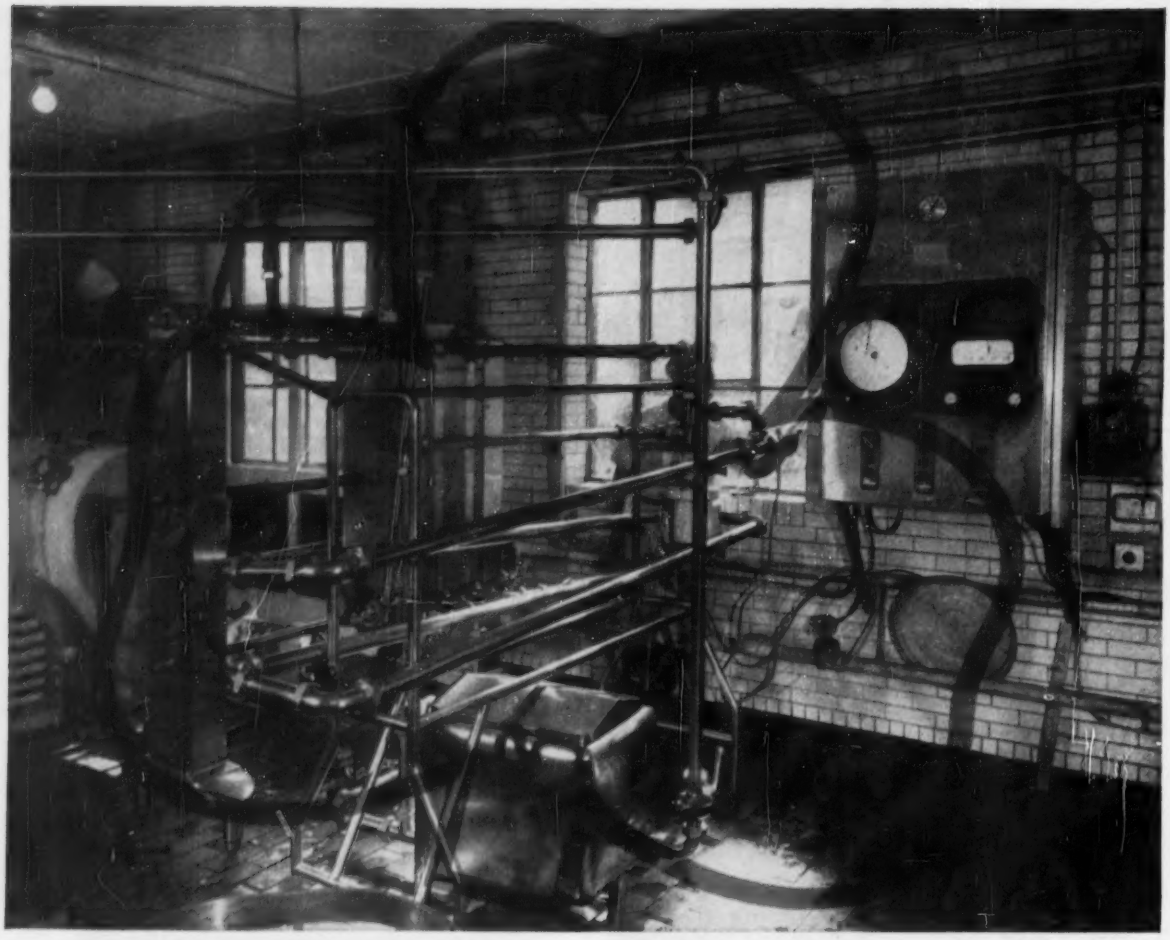

CLOVERLEAF DAIRY INSTALLS MODERN COMPACT PASTEURIZING UNIT WITH EFFICIENT TRI-CLOVER HOLDING TUBE ASSEMBLY

Instead of a major expansion program to increase the output of its conventional pasteurizing system, the Cloverleaf Dairy at Downers Grove, Illinois, installed an HTST "package"—a compact unit which was easily fitted into the existing plant setup. The results—production was doubled with only a 10 per cent increase in labor force.

An important part of Cloverleaf's new HTST unit is the Tri-Clover Holding Tube Assembly shown above. These Tri-Clover "Assemblies" are made up of highly polished, sanitary, stainless steel. This includes the solid welded hanger frame as well as fitting and tube sections. As an aid to fast washup, all parts are designed for easy assembly and disassembly. And in addition to sanitation and utility, Tri-Clover "Assemblies" are designed to give long years of dependable service—even under the stresses of continual heating and cooling. Tri-Clover Holding Tubes are pre-assembled in standard sizes. Send us data on physical dimensions required, tubing size, holding time and capacity and we can ship the complete holding tube assembly to meet your needs.

Let our experienced engineering staff help meet all your needs for sanitary fittings, valves, pumps, tubing and assemblies.

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For more information, use coupon on last page.

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INVESTIGATE this amazing NEW CONVEYOR!

IF your product is too hot, sharp or oily for belt or flight conveying, or too abrasive or sticky for screw or apron conveying — if you're getting excessive spillage, if you have cleaning problems, or any other conveying difficulties — *you owe it to yourself to investigate the Carrier Natural-Frequency Conveyor.*

These revolutionary conveyors are an entirely new *type* of vibrating equipment which substitutes Natural-Frequency spring action for brute force. Where "brute-force" conveyors may use up to 90% of their power to operate their moving parts and only about 10% to convey their loads, *the Natural-Frequency Conveyor uses substantially no more power to operate, empty, than is required to run the motor alone.*

CARRIER ADVANTAGES

HIGH CONVEYING SPEED
(Up to 100 feet per minute)

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(Up to 200 tons per hour)

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(About one-third as much as "competitive" equipment)

LESS MAINTENANCE & DOWN-TIME
(Less power + good design = trouble-free performance)

NO DAMPENING UNDER LOAD
(Designed with extra power for specified load, with positive stroke)

SELF-CLEANING
(Continuous, smooth trough — no pockets)

COMBINES PROCESSING WITH CONVEYING
(Can screen, dry, cool, dewater, blend, etc.)

WIDTHS FROM 6" TO 49"—LENGTHS FROM 5' TO 250'
(With pans 16 ga to ½" plate, of any metal, open or enclosed)

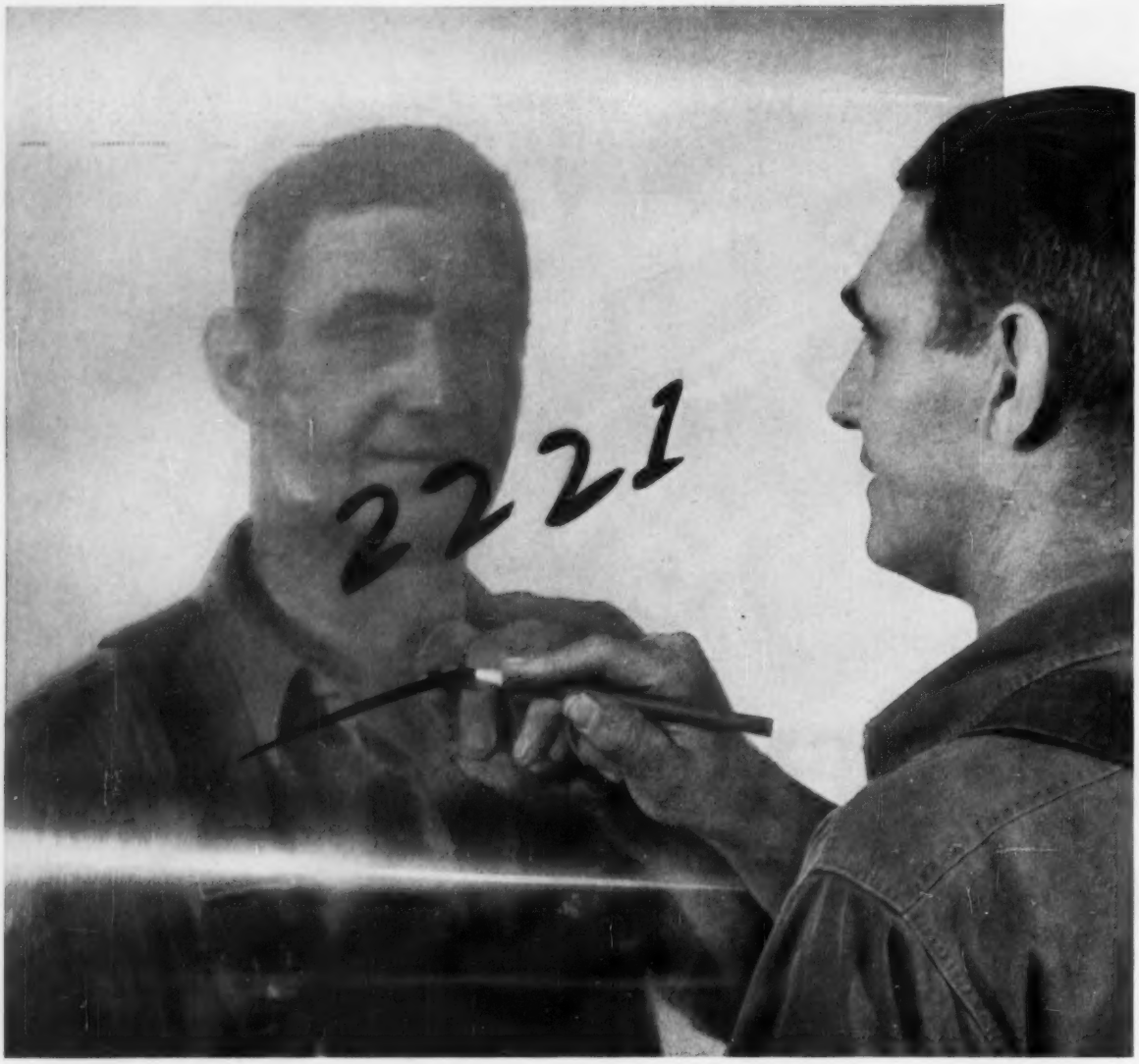
BALANCED, VIBRATION-FREE UNITS AVAILABLE
(For use on ceilings or light floor construction)

CARRIER ~~NATURAL-FREQUENCY~~ CONVEYORS

Carrier Conveyor Corporation
2152 Frankfort Avenue, Louisville 6, Kentucky
Gentlemen:
Without obligation, please send me Carrier Natural-Frequency Conveyor Bulletin No. 111.

Firm_____
Street_____
City_____ State_____
Att. Mr._____ Dept._____

For more information, use coupon on last page.



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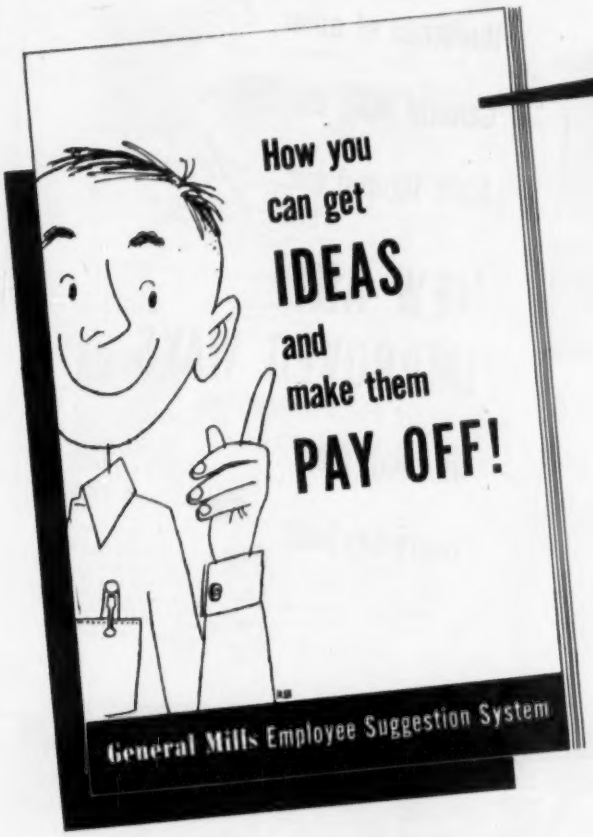


RIGHT TO THE POINT
— goes copy on cover of General Mills' lively suggestion-building guide.

NOW TURN PAGE AND GO ON THROUGH BOOKLET

— specially noting graphic technique by which highly-profitable concept of "finding better ways" is sped directly into employees' thinking.

This Suggestion System *Sparks Work Simplification*

Special booklet impels greater flow of ideas . . . Thus management gets more improvements and workers get more cash—in short, it's about the closest yet to "everybody winning, nobody losing"

IVAN C. MILLER
Associate Editor, "Food Engineering"

There was solid proof that the suggestion system used in plants of General Mills Inc. was really producing: More than $150,000 had been paid out to employees over a span of seven years.

But the company wasn't ready to rest on its laurels. It believed even more ideas could be spurred—to boost profit to both company and workers still higher.

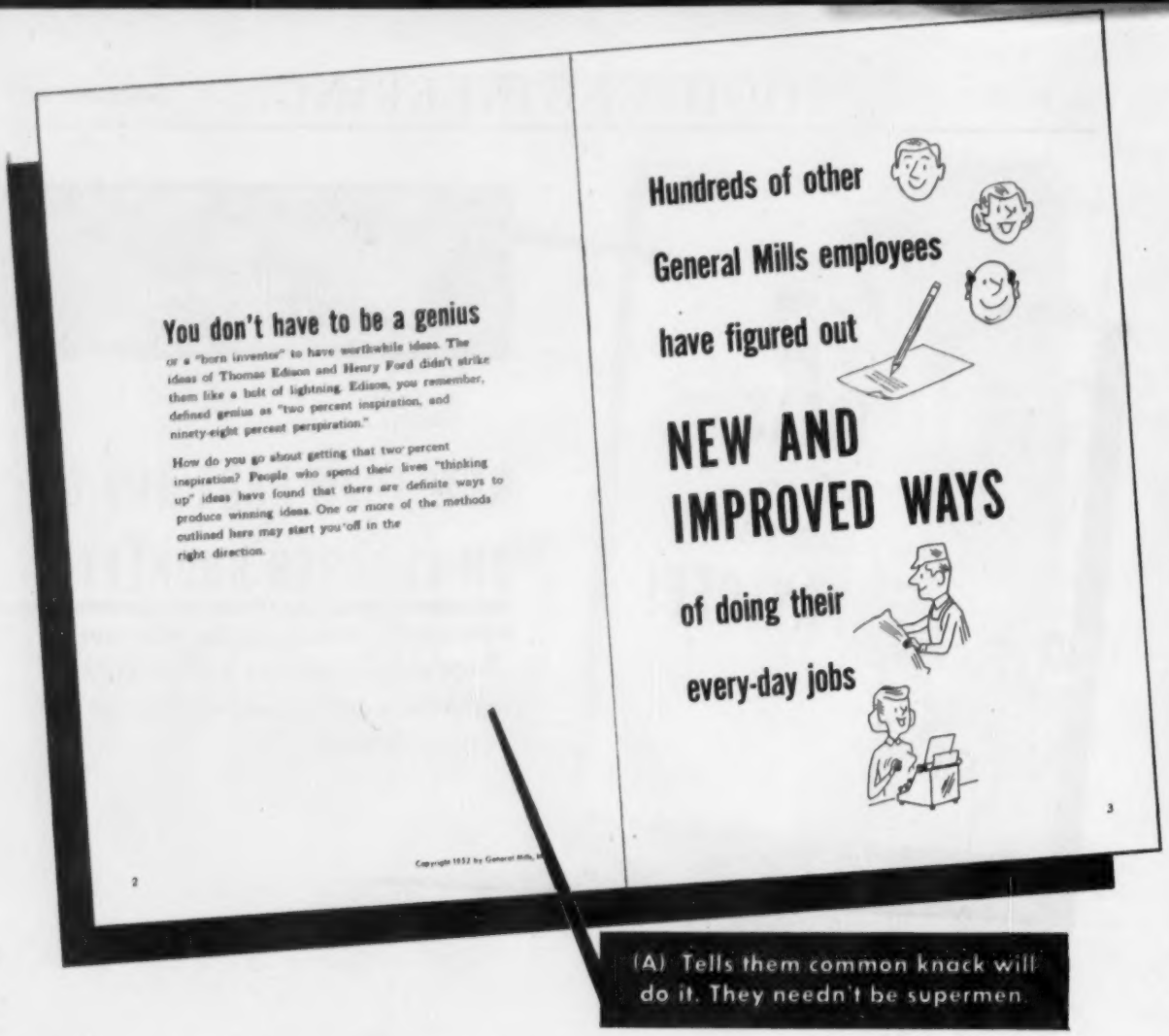
In addition, it figured that better foreman-worker communications, improving employee morale, could be brought about using the suggestion system as the vehicle.

So, after thorough study, the company prepared a special booklet (shown here page by page) to speed idea development. And this has done the trick.

Problems Faced

Here is the thinking behind the booklet, and the technique which made it tick—

It was assumed that most employees like to present


You don't have to be a genius
or a "born inventor" to have worthwhile ideas. The ideas of Thomas Edison and Henry Ford didn't strike them like a bolt of lightning. Edison, you remember, defined genius as "two percent inspiration, and ninety-eight percent perspiration."
How do you go about getting that two percent inspiration? People who spend their lives "thinking up" ideas have found that there are definite ways to produce winning ideas. One or more of the methods outlined here may start you off in the right direction.
2
Hundreds of other
General Mills employees
have figured out
NEW AND IMPROVED WAYS
of doing their
every-day jobs
3

(A) Tells them common knack will do it. They needn't be supermen.

paying ideas, if only for the money reward. But few are born inventors—and the rest have a lot of difficulty identifying potential sources of work-improvement ideas. So help is needed.

Further, average persons don't know much about estimating values or evaluating methods, and they tend to be timid about presenting their ideas.

Also, those seeking improvement ideas often "bite off far more than can be reasonably effected."

Then, too, many people with a worthwhile idea are frustrated as to how to properly express themselves.

All this indicated a lack of understanding of work simplification—which could be expected to continue until the subject could be made simpler and thus readily grasped by everyone.

Thus was born General Mills' idea-stimulating booklet to show all its people the rudiments of work simplification.

Communicating It

Of course, merely sending a message to every employee carries no guarantee that the information will be carefully noted and acted on. So GM—worked out the tactic of having members of the first-line management distribute the booklets.

However, before their release, groups of foremen and supervisors were instructed on contents of the booklet, on how to pass copies to the employees, and also on how to capitalize on this prime opportunity to establish stronger channels of communication with the employees. Foremen were advised:

1. *Not* to mail them.
2. *Not* to hand them out with any such trite comment as "here's a book for you."
3. *Not* to leave them on a table with a "Take One" sign.

Closer Relationship

Then in a round-table fashion, various acceptable distribution methods were discussed.

Actually, the final decision as to choice of circulation was left to each foreman. However, the company emphasized—

"This booklet first of all is a source of new ideas. But of almost equal importance, it is a medium for building better, closer relationships between you, as supervisors, and the employees.

"That's the main reason for distributing it through you, the first line of management. There is no better working group, or method of working, than a strongly-knit team of employees and their bosses—banded together on all things.

"Our aim is to strengthen this team spirit, never permitting inroads that might break it down."

(B) Their own fellow workers have cashed in . . .

For instance . . .

[redacted] IDEA BROUGHT HIM $35.00

His award-winning idea: Revise package weight control sheets so that one form would replace six different forms then being used.

Where the idea came from: [redacted] who works in the Buffalo Cereal Plant, noticed that it took six different package weight control forms to keep track of the necessary information. He thought: Why not combine them all into one form? So he figured out a form.

The result: His idea was adopted in the Buffalo, Chicago and Lodi Cereal Plants, and has resulted in more than a 50% saving of one form alone. Besides, it has made the information easier to find and check.

ALSO: [redacted] first winning idea led to another: He devised a combined, simplified form for Package Fabrication Inspection Reports.

[redacted] ADDED $15.00 TO HER "READY CASH"

[redacted] award-winning idea: IBM cards used for punching Social Security numbers could be used at least three or four times instead of only once.

Where the idea came from: The Minneapolis Payroll and Tabulating Department, where [redacted] is a clerk, uses eight boxes of IBM cards every quarter for punching Social Security numbers. There are 80 columns on each card, but only 12 are punched when it is used[redacted] thought: Why not set up the cards so we can use all 80 columns?

Result: The company saves about $50 a year on paper alone.

4

[redacted] AND [redacted] TEAMED UP TO WIN $630.00

Their award-winning idea: Remodel a case coding machine to handle both sizes of cases coming from the cereal case sealer.

Where the idea came from: At the Lodi Packing Department where they work, the company bought two new case coding machines, one to handle each size of case. [redacted] and [redacted] wondered why one machine couldn't be adjusted to handle both case sizes. They worked out a way to do it.

Result: The adjustment cost $250, but it did away with one machine entirely, saving both the cost of the machine, and the maintenance cost.

In the first seven years our suggestion system was in operation

General Mills employees submitted ideas that paid them over

$150,000

5

(C) . . . and so can they— four ways.

You can do it too . . .

Here are four good ways to develop ideas. Alone, or in combination, any one of them will help you get started.

1 QUESTION yourself on things you do.

2 LOOK for "weak spots"—anything that is unsafe, difficult or wasteful.

3 BREAK IT DOWN. Separate your job into its five basic parts—Operations, Transports, Inspections, Delays, Storages.

4 THINK of ways to combine steps, change their order, simplify or eliminate. Think hard, and keep on thinking.

A closer look at these "idea-generators" will get you off to a fast start . . .

6

You can . . .

ASK yourself questions about every routine job you do. Maybe there's an easier way to do it.

How many different steps make up the job? Could you leave out one, or combine a couple?

If you have to make several copies of a report or form, where do all of them go? Is there a similar report going to the same people? Could they be combined?

Just because a job has been done a certain way for years doesn't mean that there isn't an easier and quicker way to do it. Maybe nobody has ever stopped to question it.

If you keep asking yourself questions, you're sure to find some answers, and one of them may be a winning idea!

7

(D) Their questions will lead to answer$.

Continued

(E) Their looking will spot things that should be fixed.

— or you can . . .

Examine every job, and every method of doing every job that you have anything to do with. There may be "weak spots" which

WASTE energy, time, money or materials.

CAUSE damaged goods.

REQUIRE repeated handling.

DUPLICATE figures, reports or actions.

CAUSE accidents.

REQUIRE too much walking.

If you find a "weak spot", track it down. You're on the trail of an idea.

8

— or you can . . .

Take every job apart to see what makes it tick. You'll find that most of them have five main parts:

OPERATION . . . something is done or takes place that adds value to the product or method.

TRANSPORT . . . something or somebody moves from one place to another.

INSPECTION . . . something is counted, weighed, checked or tested.

DELAY . . . something happens to hold up the job.

STORAGE . . . Goods or products are put somewhere for safekeeping until used.

If you can figure out some way of improving Operation or reducing Transport, Inspection, Delay, and Storage costs, you may add value to your job AND CASH TO YOUR POCKETBOOK!

9

(F) And all factors will show crystal clear when they "break" jobs into their parts . . .

(G) . . . on this simple form.

WORK BREAKDOWN CHART

Operation:
Subject Charted:
How It's Done (present)

Operations	Transports	Inspections	Delays	Storages	Time (minutes)	Distance (feet)

Here's an easy way to take apart a process or procedure. You can make up your own form like this, or use the regular company Process Analysis Form No. 3801 GM.

Put down each step as it takes place. Then check whether it's an Operation, Transport, etc. . . . Add up each column of check marks. Then see if you can cut out any Delays; combine one or more Inspections or Transports; or make other improvements.

(To help you, there are filled out sample forms on pages 13 and 14.)

10

— or you can just . . .

Think! When you have a spare minute, think about the things you do every day. If there are Delays, what causes them? How many Inspections are there on one job? How many Transports? Is a job being done in the right order?

You'll think of any number of other questions. Can you . . .

COMBINE?

ELIMINATE?

CHANGE THE ORDER?

SIMPLIFY?

You'll be amazed at the ideas that will pop into your head when you really stop to think!

11

(H) Then a bit of straightforward thinking . . .

(J) . . . comparing present way . . .

But "thinking up" an idea isn't enough . . .

YOU HAVE TO DO SOMETHING ABOUT IT!

Here's what you do . . .

ON A SUGGESTION FORM

First, write a description. Tell what your idea is supposed to do . . . what its advantages are . . . whether it will lower costs, be safer, save time and money, etc.

Then, if your idea needs more explanation, try "drawing a picture."

Layout. If your idea has to do with Transport, or re-arranging equipment, make a diagram or floor plan. Just a simple one, but be sure it's accurate.

Sketch. If your idea has to do with a piece of machinery or a design, make a rough sketch. You don't have to be an artist. You can make notes to explain your drawing. Just so you make clear what you have in mind.

A work breakdown chart. If your idea has to do with changing a process or method, use Work Breakdown Charts—"Before" and "After"—like those shown on the next two pages.

REMEMBER— Your supervisor is always glad to help you. Don't hesitate to call on him for advice.

12

Work Breakdown Chart — *Present Method*

WORK BREAKDOWN CHART
Operation: Refueling the Lift Truck
Subject Charted: Driver
How It's Done (present)

	Operations	Transports	Inspections	Delays	Storages	Time (minutes)	Distance (feet)
(Lift Trucks refueled twice each shift the following takes place, 6 hours per day on a 3 shift operation)							
Drives Lift Truck from work area to outside door		X				1	150
Gets off Truck and opens door (always closed) and returns to Lift Truck	X					1	
Drives through door							
Gets off, closes door, returns to Lift Truck		X				½	
Drives down ramp, across R.R. Tracks to gas pump	X					1	
Puts gas in Truck		X				2	300
Checks oil and water (adds when necessary)	X					4	
Walks to garage desk			X			1	
Records amount of gas and oil		X				1	40
Walks back to Truck	X					1	
Drives back across R.R. Tracks to door		X				1	40
Gets off; opens door, returns to Truck		X				2	300
Drives through door	X					1	
Gets off, closes door, returns to Truck		X				½	
Drives to work area	X					1	
Totals		X				1	150
* Have averaged 4 trucks refueling per day on the ramp-Tracks. Spring	6	8	1			19	780

Here's how one employee analyzed the job he was trying to improve.

13

(I) . . . putting it on paper . . .

Work Breakdown Chart — *New Method*

WORK BREAKDOWN CHART
Operation: Refueling Lift Truck
Subject Charted: Drivers
How It Could Be Done

	Operations	Transports	Inspections	Delays	Storages	Time (minutes)	Distance (feet)
Drives truck from work area through dock door to new pump at end of loading dock (dock door always open)		X				1	150
Puts gas in Truck	X					4	
Checks oil and water			X			1	
Records amount used	X					1	
Returns to work area		X				1	150
Totals	2	2	1			8	300
Old way totals	6	8	1			19	780
New way SAVES	4	6				11	480
(Estimates indicate that the new pump, truck and shelter would be paid for in the first year of use.)							

And here's what he did about it. This is the chart he made to show how the job could be done better. See how much time he saved: 2 less transports, 1 less inspection, no delays. Simple idea? You bet—but no one had ever thought of it before.

14

(K) . . . with new idea . . .

(L) . . . and finally into the box.

Finally, when it's all ready . . .

DROP IT IN THE SUGGESTION BOX

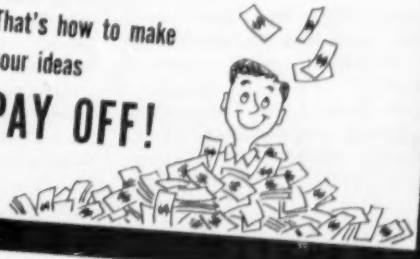
Then watch the bulletin board.

Don't forget! Your supervisor is interested in having you come up with a winner. Call on him if you need help.

Be sure to keep the stub from your suggestion form. Then if your idea wins, you can claim the credit—AND THE CASH!

Didn't you get a lot of satisfaction out of thinking up your idea? WHY DON'T YOU TRY AGAIN?

That's how to make your ideas PAY OFF!



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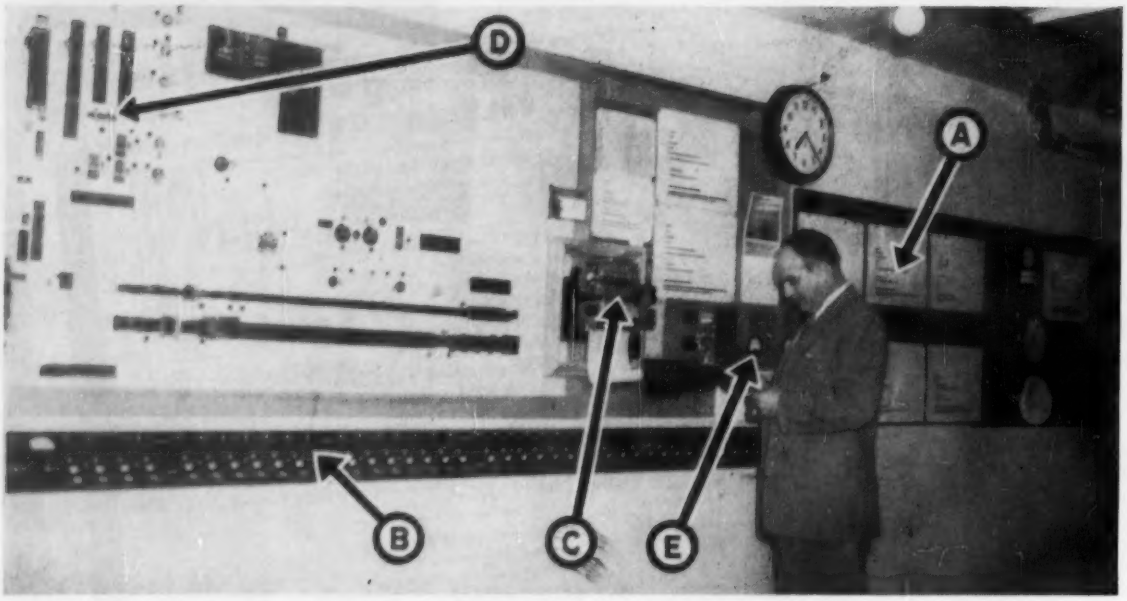


FOOLPROOF, continuous production-recording system consists of charts (A) showing total hours machines operated each month, electric panel (B), chronograph (C), floor plans (D), and counters (E).

INSTRUMENT SYSTEM Robot-Checks Process *And More*

Engineer tells how automatic devices he installed eagle-eye all machinery operations on special full-view pilot-lighted floor charts . . . ¶ Continuously record equipment performance during entire work day on electrically-timed unit . . . ¶ Totalize fractional-time starts and stops on key lines

MINOS J. ASPROYERAKAS
Chief Engineer, De Mets, Inc., Chicago

Our problem at the plant of De Mets, Inc., Chicago, high-quality confectioner, was that basic poser—how to accurately determine production costs.

To us, getting the straight facts was vital, since they enable management to direct future plant operations intelligently.

And we finally found the solution—in a special dual checking system. It comprises, first, a diagrammatic floor plan illustrating machine positions, with pilot lights indicating whether the equipment is operating, and second, an electrically-timed recorder.

Today, with this system, our production manager can visually see, at any time, which machines are running and which are not . . . when any stop . . . and for how long. And he sees all this without having to leave his office.

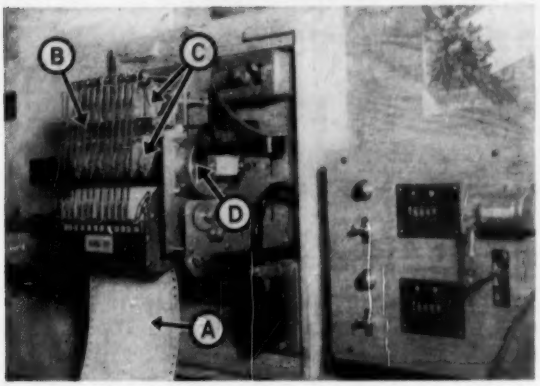
Also, at the end of the work day, he can rapidly figure total operating time or downtime of all machines. What's more, he has a check on the efficiency of his personnel.

We had specifically sought a system not requiring trained personnel, yet one fully capable of showing our production manager exactly what all his machines were doing at anytime. Were they running, or not? And if not, why not?

Then, at the end of the day, the desired system had to supply a complete record of the day's performance—through some simple, rapid method of telling total unit operating time.

With this data, top management could make pertinent decisions regarding scheduling and control of future operations.

↓ Chart is readily stripped off and totaled ↓



KEY to system is this recorder. It comprises chart (A), pen arms (B), relays (C), and drum motor (D).

AT DAY'S END, Author Asproyerakas quickly totals running time of each machine recorded on chart.

Obviously, such a system becomes increasingly important as the food industry continues to mechanize. This means installing more machines, thus making it more difficult to collect performance data. What's more, the manual task of obtaining such figures becomes truly Herculean as more complicated machines are designed and factory size increases.

Trouble with present methods is that the highly trained production manager often must follow, check, and direct operations as well as collect machine performance and output data. Generally, it is impossible for him to eagle-eye more than a few machines a day. And what data is presented to top echelon is sometimes insufficient or not exact enough to be used as a basis for making on-the-spot or future decisions.

To ease this responsibility, some plants have assigned trained personnel to keep records of machine performance.

But—such men can only maintain records on a few machines. And, being human, their records tend to suffer from the human-error element.

And then there is the extreme—where machine performance is *not* checked. In this case, management's conception of how its machines are operating is inadequate—both in terms of output and performance. To make decisions, it must then rely solely upon an often poorly defined operational picture.

Usual method of evaluating operating efficiency is to compare manually-obtained data on a daily, weekly, or monthly basis. If improvements are steadily indicated, then management remains satisfied. On the other hand, if there are no improvements taking place, then costly decisions are frequent.

Also, because of the inaccuracies of figures in some instances, management may direct Production to step up the performance of machines already operating at their peak. Or it may have an actually false belief that it is getting all it can out of its machines.

Often, too, considerable valuable time is spent studying complicated production figures—only to find it too late to correct the mistakes.

Advantages of New System

Under former methods, a plant's production manager might cover up his inability to produce efficiently by persuading top echelon to purchase additional equipment. And having no truly accurate conception of the productivity of its machines, top management likely might be easily convinced.

Suppose that management in a bakery has directed the superintendent to step up bread production. Again assume that a production-recording system has just been installed. And further that the plant superintendent has requested an additional combination bread slicing-wrapping machine.

Before management would okay the purchase, it would await results of the recorder. At the end of the month, operating time of all machines would be totalized.

Then management might find out some very revealing facts. Perhaps instead of needing more machines, it might discover it already had too many!

For example, one slicer-wrapper may have run only 10 hr. 58 min.—when it had the capacity of operating 150 hr. (total working time for a month). In comparison, a similar machine may show better performance of 97 hr. And another maybe 125 hr.

Finger On the Guilty

Our new fully automatic recording system protects the production manager from being accused of operating his department inefficiently. It shows no favoritism, for it enables management to pinpoint responsibilities.

What System Does—

1. Shows instantly, at any moment what occurs in production department.

2. Records total time the machines operate or are idle during day.

3. Provides complete picture of machines' working productivity.

4. Furnishes data on daily operation of machines related to working time—starting and stopping.

5. Indicates whether or not all machines are in use and, if not, provides a basis for checking reason for downtime.

6. Supplies daily a recorded graph of productivity of all machines in operation—and without need of trained personnel to check the performance.

7. Enables Production to gage efficiency of its workers.

It is notable that surplus instruments and parts purchased in local stores were employed by Author Asproyerakas in rigging up his ingenious system (patent applied for) that visually spots and continuously records the performance of 37 candy-making machines. His technical experience goes back to the days when, in Athens, Greece, he operated his father's utilities concern, which supplied about one-quarter of the city with water, ice, and electricity.—The Editors

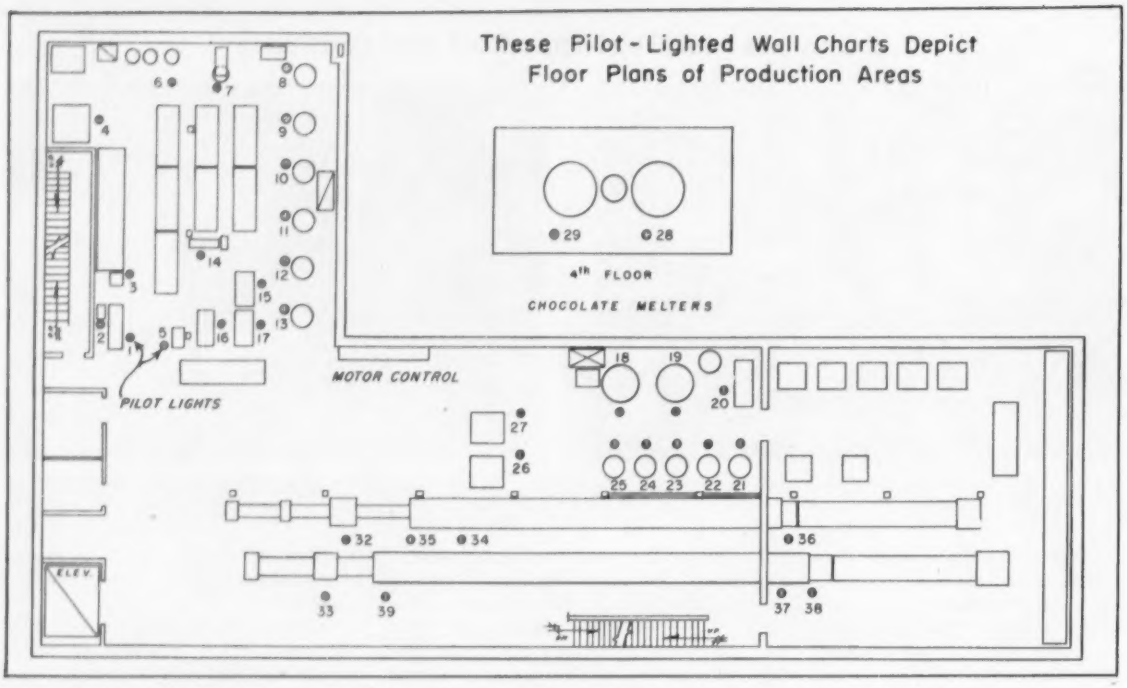


FIG. 1. **WALL-MOUNTED** layout shows location of each machine (numbered and pilot lighted) in production areas.

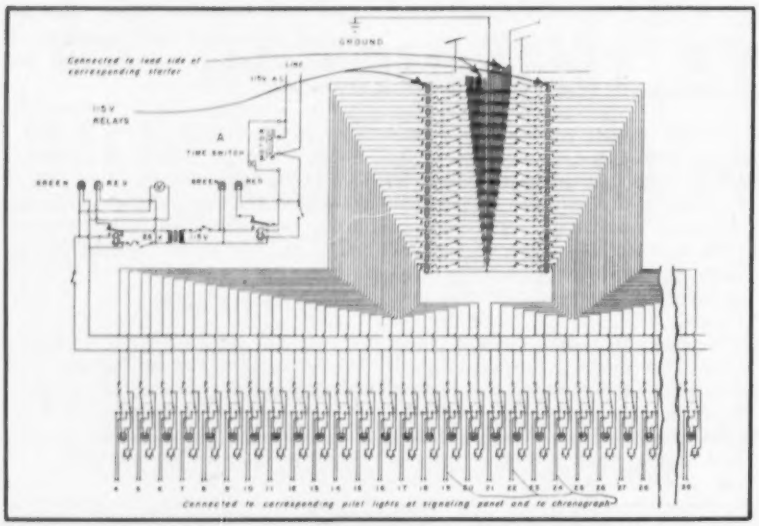


FIG. 2. **WIRING** diagram shows operating circuits that are connected to various units of motor-control starter center.

For instance, our recorder will show us if Purchasing has enough raw materials or packaging supplies on hand . . . Or if Maintenance has repaired a machine in time . . . Or whether Personnel has hired sufficient help, say, during the start of a heavy production season . . . Or it will indicate the status of our power supply.

This system can also "catch up" with inefficiencies in a plant's production department. Thus, in a cookie plant machine downtime might be traced to, say, inability to properly temper chocolate coating in sufficient time. Or the enrober may not be operating because cookies have not been prepared in time.

The spotting of responsibility can be achieved in this manner: At the end of each work day, the chart may be torn from the instrument and a code letter written into each space not contacted by an inking pen (indicating machine idle time).

Letters could be keyed this way: R for repairs, P for power, H for lack of help, M for no raw materials, C for no cartons, and T for chocolate not properly tempered.

Too, from recorded data on machine performance, Production can also figure the cost of each pound of candy produced on any time basis—by the minute, hour, day, week, month, or year.

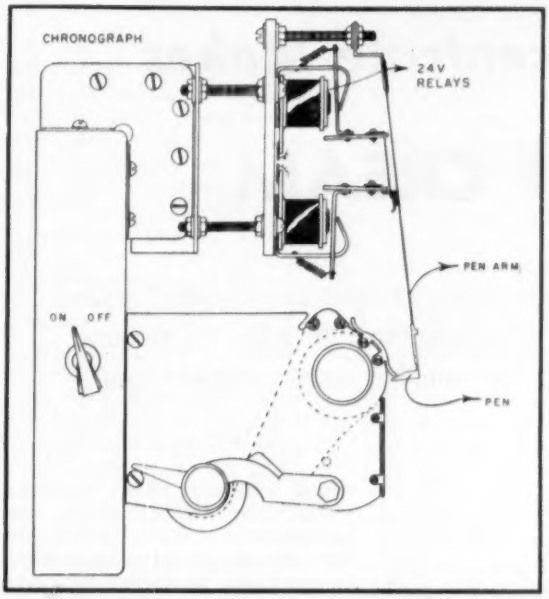
Also, we can calculate total hours our plant operated each month. We have had, for example, such hourly work figures per month as 160, 132, 184, 176, 160, 152, and 80. And we were able to track down reasons for low figures. The second figure—132 hr.—was for a short month, February. And the 80-hr. figure was traced to a summer month, when the plant was shut down 15 days for maintenance purposes.

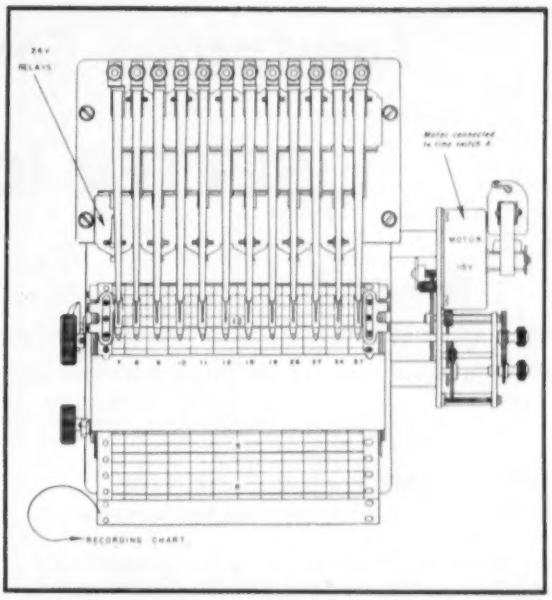
About the Prime Units

The entire production-checking system in our plant has been successfully operating a little over a year. Units are in the engineer's office, and comprise two floor plans, electric panel, and chronograph (time-interval recorder). Wall-mounted floor plans (Fig. 1) show exact position in the plant of 37 machines, each drawn in detail.

Every machine is numbered, and spotted above each number is a red pilot light. Our plans are drawn to a scale of ¼ in. equals 1 ft.

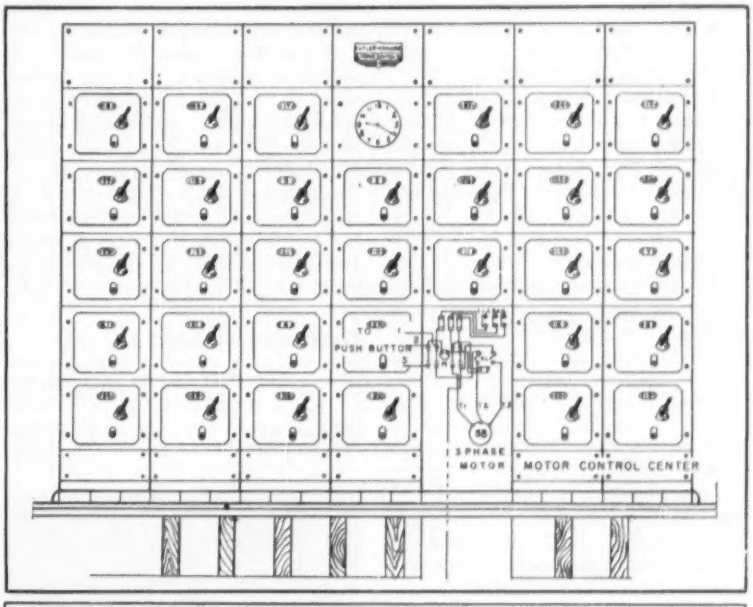
Directly below is the electric panel (Fig. 2), with numbered units, each corresponding to a machine (the first three being omitted as unnecessary) on the floor plans. Each unit consists





FIGS. 3 & 4. CHRONOGRAPH (side on left, front on right) is connected to pilot lights on floor charts. It records elapsed operating and non-operating time for each machine.

FIG. 5. MOTOR-CONTROL starter panel box. Note partial circuit diagram for operating parts.



of a fuse, double-pole double-throw switch, pilot light, and momentary switch.

Purpose of the d-p d-t switch is to manually close, by electric circuit, signal lights on either floor plans or electric panel. On the other hand, the momentary switch checks signal lights on floor plans to determine if the light bulb has burned out, even though the machine may be operating.

Chronograph Is Key Device

Installed to the right of the floor plans is the chronograph (Figs. 3 & 4), which is electrically connected to

(*Turn to page* 198)

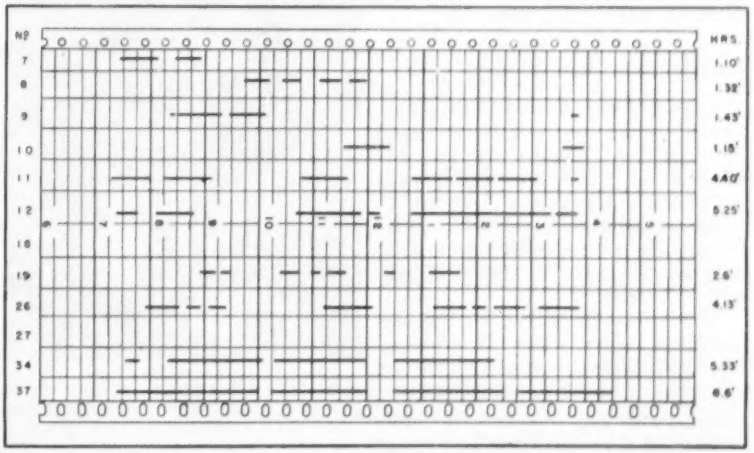


FIG. 6. DAILY record chart taken from chronograph shows running and idle time of 12 machines. Heavy broken horizontal lines indicate time corresponding machine operated. Total length of these lines gives running time of daily operation (totaled on right margin). Spaces between lines represent down-time. Sample explanations: Unit 7, two batches of hard candies, first of which took longer than second. Unit 8: four batches, with intervals between to clean out kettles. Unit 18: Cream beater not running that day, so no line here. Unit 34: Enrober delayed soon after start (perhaps chocolate not tempered in time, or lack of centers or cartons). Also note here 15-min. rest period just after 10 A.M., also 30-min. lunch period.

Low-Lactose Concentrate Makes

BETTER ICE CREAM

Smoother mouth feel, closer body, richer taste characterize product with increased milk solids-not-fat. Danger from sandiness obviated by enzyme conversion of lactose in concentrate to simple, more soluble sugars

JOHN J. SAMPEY and C. E. NEUBECK

Respectively, Abbotts Dairies, Inc., and Rohm & Haas Co., Philadelphia

Application of a new process in the making of concentrated milk products now makes it possible to produce ice cream with greatly improved texture and resistance to heat shock.

It also enables an increase in ice cream's dietary protein content—particularly important to children.

Technique is to convert a part of the lactose in the concentrate to the simple, more soluble sugars, glucose and galactose. This enables increasing the milk solids-not-fat in the ice cream mix from the customary 10-11% to 13-14%* without danger of lactose crystallization (sandiness).[1,2,3,4,5,6]

A number of methods have been previously suggested for overcoming sandiness in high solids-not-fat ice cream. Among them were: (1) Prior crystallization of the lactose;[7,8] addition of certain inorganic salts[9,10] or riboflavin[11] to the mix; and addition of skim milk powder directly to the mix as it enters the freezer.

Latter method is quite economical, but requires powder of particularly low bacterial count. Resulting ice cream is stable as produced but subject to lactose crystallization in case of partial melting and refreezing.

Enzymes Seen Best Solution

A fundamental solution to the problem is the hydrolysis of lactose into its component monosaccharides. In solutions of crude lactose this can be carried out with acid,[12] but in a whole or skim milk substrate, it is necessary to use a specific enzyme that does not adversely affect the milk protein or butterfat.

The enzyme found best for this hydrolysis is called lactase. It is found in plants, animals, and various microorganisms. Hydrolytic activity of preparations from these sources is affected somewhat differently by the pH, temperature, concentration of lactose, and concentration and nature of other components present, but all types bring about hydrolysis of lactose.

Almonds are most commonly employed as a source of plant lactase, while the intestinal mucosa of young animals is used as a source of animal lactase. The enzyme is more widely distributed in microorganisms, its presence having been demonstrated in several bacteria, fungi, and yeasts over the past 50 years. However, all known practical procedures for its growth use yeast.

Preparation of Yeast Lactase

Occurrence of lactase in yeast was shown for the first time by Beijerinck,[13] who used lactose fermenting-yeasts isolated from kefir grains and Edam cheese. Several other fermenting yeasts, many of dairy origin, were later shown to contain lactase. As a rule, their growth on a medium containing lactose produces cells capable of showing lactase activity when plasmolyzed.

ICE CREAM tastes richer, feels smoother, has higher protein content when milk solids-not-fat are upped.

The plasmolysis may be brought about by addition of organic solvents or inorganic salts, by drying followed by soaking in water, or by mechanical rupture. Lactase is recovered in the cell-free filtrate.

First patent applications for use of the enzymes to hydrolyze lactose, as described by Turnbow and Gray,[14,15,16] employed the lactase of kefir grains—masses of bacteria and lactose-fermenting-yeasts produced by the fermentation of milk to kefir. Its preparation consisted of grinding dry kefir grains in presence of pulverized glass followed by soaking in water. Active lactase was found in the filtrate of the plasmolyzed cells. But this procedure was found unsatisfactory for large scale utilization.

Attempts were made at the Bureau of Dairy Industry to produce a dry active lactase which could be used commercially.[17] However, results were not encouraging, although lactose-fermenting-yeasts apparently were the most satisfactory of sources tested.

An active preparation of dry yeast lactase has been prepared in the laboratories of one of the authors, using a pure culture of lactose-fermenting-yeast as the starting material. This is cultured on a sterile nutrient medium containing lactose.

At the completion of growth, cells are separated from the spent nutrient and washed. Cells are then plasmolyzed, and dry, active lactase is prepared from the filtrate. Dried concentrate is brought to a standard activity by the addition of cane sugar. Similar work has been reported from the Netherlands.[18]

The hydrolysis of lactose to glucose and galactose gives rise to one addi-

*Appearance of a salty flavor at high levels limits skim milk solids to 15%.

tional aldehyde group. Therefore, its progress can be followed by measuring the increase in reducing power of the treated solution. The Willstaetter-Schudle hypoidodite method for the determination of reducing sugar[19] and the Zerban-Sattler method for monoses[20] were used in most of the work reported here. A reliable colorimetric method was reported by Potter.[21]

Preliminary data obtained by Potter and Webb[22] indicated that the lactose of skim milk and whey was hydrolyzed by yeast lactose under a variety of conditions. In common with other enzyme reactions it is influenced by factors such as pH, temperature, time, and solids content. Effects of a number of these factors have been determined with Lactase B** on 10% lactose hydrate in M/15 phosphate buffer solution (see Table I and Fig 1).

Optimum activity of yeast lactase at 105 deg. F. occurs over the pH range of 6.0-6.5. At lower temperatures the pH range is broadened and its control is less critical. Optimum temperature varies with time of test. It is 113 deg. F. for short, 15-min. periods, but is 105 deg. for periods longer than 30 min.

The hydrolysis can be extended to high levels by increasing either the time of reaction or the quantity of lactase, but the enzyme is most efficient at hydrolysis levels below 40%.

Generally only 15-20% of the lactose in skim milk concentrates need be hydrolyzed to permit their use in preparation of ice cream of high skim-milk-solids. The action of Lactase B has, therefore, been investigated on milk products within this range. There is no need for pH adjustment of most dairy products (excepting acid whey and whey concentrates), since it falls within the optimum range of lactase activity (see Fig. 1 and Reference 22).

Storage of concentrated milk products varies widely in the dairy field. Therefore, conditions required to bring about the desired hydrolysis with lactase can be best determined by each individual dairy. As a guide, a series of experiments was made to determine extent of lactose hydrolysis in skim milk concentrate under a variety of temperatures and times.

**A dry lactase concentrate prepared from a lactose fermenting yeast supplied by the Rohm & Haas Co., Philadelphia.

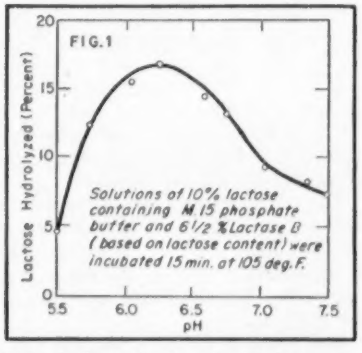


FIG.1
Lactose Hydrolyzed (Percent)
pH
Solutions of 10% lactose containing M/15 phosphate buffer and 6 1/2 % Lactase B (based on lactose content) were incubated 15 min. at 105 deg. F.

FIG. 1. Importance of pH factor in hydrolysis of lactose by enzyme.

Time, Temperature Studies

Concentrate (32% solids and pH 6.3) was treated with 1% Lactase B based on its lactose content. Samples were removed periodically and tested for extent of hydrolysis. Fig. 2 gives data obtained over a temperature range of 40-131 F.

Maximum activity was shown at 111-120 F. At 131 F. some hydrolysis occurred during the first hour, but after this nearly all of the Lactase B was inactivated and there was no further hydrolysis. As the temperature was lowered, time of holding increased so that at 59 F. about 16 hr. were required to get 15% hydrolysis. At 41 F., 2½-3 days were needed.

Since storage at 40 F. may run for several days in commercial practice, this latter procedure appears to be feasible. Where longer storage is used, level of enzyme may be lowered accordingly. Table II gives results obtained on condensed whole milk and condensed skim milk treated at 40 F. with 0.67% Lactase B.

Dry milk powders were prepared from condensed milk products of 42% solids in which about 20% of the lactose was hydrolyzed using both low temperature (40 F.) and high tempera-

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How Hydrolysis Proceeds in Water and in Milk

TABLE I—RATE of Lactose Hydrolysis at Various Times and Temperatures Was Demonstrated When a 10% Lactose Hydrate Solution in M/15 Phosphate Buffer at pH 6.5 Was Treated With 3.1% Lactase B.

Temperature (Deg. F.)	Percent Lactose Hydrolyzed (Time, Minutes)		
	15	30	60
69	2.4	4.5	9.1
87	3.8	8.1	14.5
95	...	10.3	17.5
105	7.4	14.5	21.6
114	10.7	13.7	21.6
123	6.8	...	...
150	2.2	...	...

TABLE II—HYDROLYSIS of Lactose in Condensed Milk Proceeds Slowly at 40 F. (Products treated with 0.67% Lactase B, based on lactose content)

Product Tested	Percent Lactose Hydrolyzed (Days of Storage)					
	1	2	3	5	7	11
Condensed skim milk	5	..	15	25	32	47
Condensed whole milk	..	17	..	34	..	..

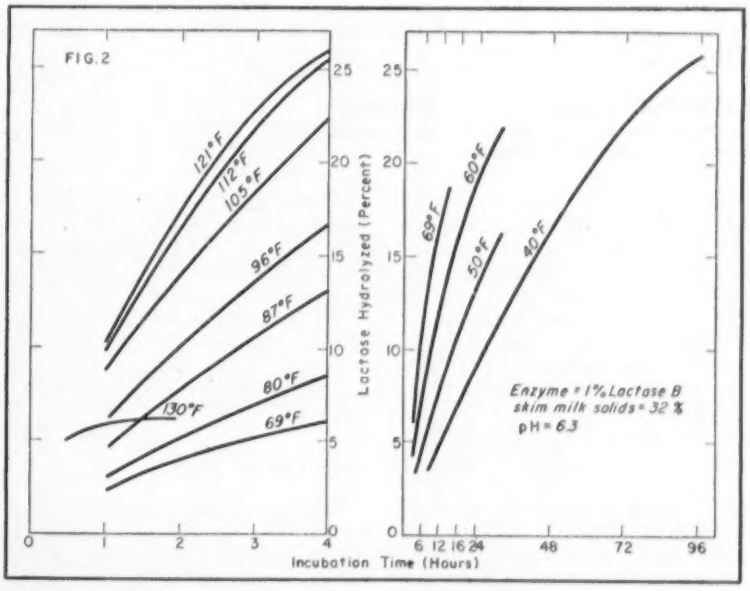
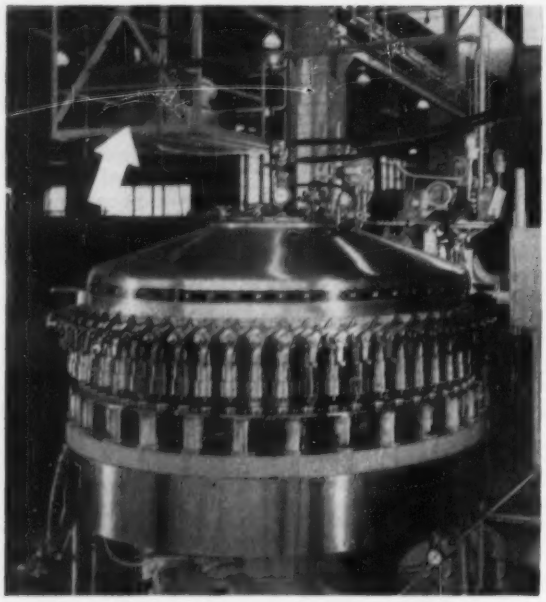
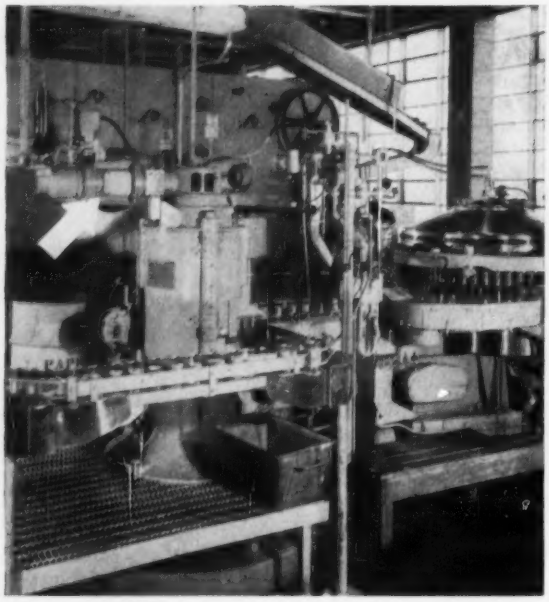


FIG. 2. Temperature controls speed of hydrolysis of lactose in skim milk concentrate. Note how 130 deg. F. quickly inactivates the enzyme.



SET ON out-of-the-way overhead platform (arrow) hydraulic pump supplies power to hydraulic motor on can-closing machine (photo right).



BESIDES driving can closer, this hydraulic motor (arrow) runs can-filling machine through a power take-off—at rate of 450 to 600 cans a minute.

Rockets Canning-Line Output With Hydraulic Drive

Used on synchronized filling and closing machines, it has pushed up brewer's productivity from 450 to 600 cans per min . . . And baby-food packer's turnout has been boosted to over 1,000 cans per min.

JUSTIN SIMPSON and V. JURKONIS

Respectively, Director of Equipment Development, Continental Can Co., Chicago, and Engineer, The Oilgear Co., Milwaukee.

By installing a variable-speed, hydraulic drive on its closing machine, a large Midwest brewery has increased output on its beer-canning line from 450-600 cans per min. And no major redesign of machine was necessary.

What's more, this brewery has minimized spillage during transfer of cans from filling to closing machines, also line jam-ups.

As for reducing spillage and "dead heads" (rejects due to faulty closures), no accurate figures are yet available. Significant, however, is the brewery's ability to accelerate its 6-spindle closing machine from zero up to 490 cans per min. in about 2 sec. without spillage. The step-up in speed is not excessive inasmuch as line pressure does not exceed limit of the drive and normal running pressures are about three-quarters of that limit.

While maintenance on the synchronized filling and closing machines is expected to be reduced, there are not yet enough data to indicate the extent.

"Jack-Rabbit" Starts

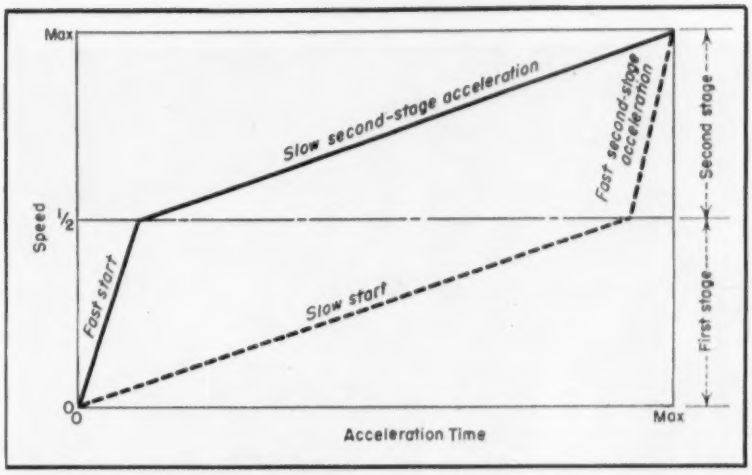
Trouble with the conventional drive formerly used was the jerky jack-rabbit starts, which put a severe strain on the machine's gears and shafts. Such starts were also responsible for faulty closures and spillage.

And when a jam-up occurred with the old drive, other machine parts were apt to break, causing production loss and maintenance expense.

Big problem in starting the closing machine was the inertia created. For, by the time the machine's working parts got into motion there was a strain on the gears and shafts. This then led to early maintenance and repairs, especially if the machine had to be frequently started and stopped.

The originally used closing machine was designed for a 300-can-per-min. output. Soon after, its capacity had to be increased to 450 cans per min., and without completely redesigning the machine.

But when a 600-min. output was



DIFFERENT ACCELERATION patterns are permissible with the hydraulic drive. Solid line shows fast acceleration to half-speed to quickly pass critical seaming speed, followed by slower acceleration to full velocity. Broken line shows reverse order of acceleration rates.

sought—still without completely redesigning the machine—then serious consideration was given to adopting the fluid drive.

Benefit of Hydraulic Drive

It was at this stage that Continental Can Co.'s engineers approached The Oilgear Co. to look into the significant plus-features of the latter firm's hydraulic drives. Pointed out were sought-for features that enabled adaptation of this drive to the original closing machine so that it could handle the 600 per min.

What the hydraulic drive did was control accurately and reliably, the acceleration rates—from zero to top speed. Because of its flexibility, it provided various forms of acceleration, permitting the machine to step up slow or fast—even at speeds between slow and fast, or fast part way and slow another, or slow part way and fast the rest.

This drive's cushioning properties—control of acceleration and overload protection—also took the strain off machine parts.

Another advantage was the drive's excellent braking characteristics. Smoother and faster deceleration, at a controlled rate, now takes the strain off the machine.

Yet another benefit was speed control. With the fluid drive, speeds are accurately controlled and changed at any time by a hand-screw adjustment. And still another dividend was the simple method of attaining overload protection.

At this brewery, the fluid drive is, as stated, hooked up to the 6-spindle closer, and the 60-spout filling machine is driven by a power take-off from the closing machine. The hydraulic motor (20 hp.) is run by an electrically driven variable displacement pump, remotely located on a ceiling-suspended platform so as not to take up valuable floor space or expose the electric drive to water-damage during clean-ups. Motor occupies only 10x10x18 in. of space, and pump 25x32x56 in.

Also, as stated, in going to fluid-drive, major redesigning of filling-closing machines was unnecessary. Required, however, was the power in-put end of the machines, which called for changing of the gearing. Eliminated with the present arrangement were safety clutches (that did not work too well) and electric power brakes.

Over 1,000 Per Min.

Success of this machine, once the hydraulic drive was incorporated, encouraged Continental Can Co. to construct and put into operation at least 50 similar ones, with more on the way. Moreover, this firm has recently developed a 10-spindle closing machine employing a hydraulic drive of simpler design. This unit now enables a large packer of baby foods to turn out over 1,000 cans per min.—with 1,200 a present possibility.

Filling machines are rated on the amount of product filled hourly into cans. Influencing the speed of fillers are size of cans and viscosity of product. Speeds are, therefore, faster with smaller than larger size cans.

Also, non-spilling, viscous, puree-type products like pumpkin handled on, say, a positive displacement-type filler are run through faster than easy-to-spill, non-viscous products filled by a gravity-type machine.

When switching from one product to another—as with baby or junior foods—packers must rapidly and frequently change the speed of their fillers. Since filling and closing machines are synchronized, latter's drive must be variable. Here's where the hydraulic drive fits beautifully.

Workings of Drive

And now, how does the fluid drive used on this brewery's closing machine operate?

First off, it comprises a variable displacement pump driven by a constant-speed electric motor, with both set up over an oil-reservoir base. This pump drives a positive-displacement hydraulic motor mounted on the machine. Connecting pump and motor are two pipe lines.

Speed of the hydraulic motor is easily varied—faster or slower—by pumping more or less oil to it. And the torque can be considered constant for all practical purposes.

Variable-displacement radial pistons in the pump (pistons operating at right angles to axis of rotation) deliver oil to the hydraulic motor. And the more oil delivered by the pump, the faster the motor runs.

To vary oil flow and motor speed, the length of the stroke of the pump pistons is adjusted by an eccentric unit, which is moved by two hydraulically-operated, oppositely-driven pistons.

In the built-in control, the smaller piston, which covers approximately half the area of the larger one, is under constant pressure from a hydraulic-pilot system. Pressure is attained from a built-in gear pump that develops a constant, single-direction force. Larger control piston is alternately under pressure or vented to atmosphere, by selection, through a solenoid-operated, 3-way valve.

Pilot-control system is arranged so that when the solenoid is de-energized, the larger control piston is vented. Pump then does not deliver oil to motor, which, in turn, comes to a standstill. But when solenoid is energized, pilot pressure applied to larger control piston is of sufficient force to overcome that of the smaller one. Pump is then in a position to deliver a predetermined amount of oil to motor.

The rate that the pilot oil is fed into large control piston determines how rapidly the motor speed is changed, or how fast it accelerates the can-closing machine.

There is pre-setting of maximum volume of oil pumped and top motor speed by an adjustable screw that serves as a mechanical stop in limiting the distance the larger control piston

(*Turn to page 211*)

COMBINATION of cold storage doors shows turnpike principle of dual-lane one-way traffic. Lift trucks enter cold storage vault by one door and exit on opposite side. New system couples speed with safety to personnel.

New Cold-Room Doors

Improve Warehouse Operations

Special in-and-out doors and vestibules provide quick access for lift trucks, cut refrigeration loss, protect personnel. And many other advanced features are incorporated in new warehouse

A. W. RUFF
Vice-President & Secretary, V. C. Patterson & Associates, York, Pa.

In building its big new refrigerated warehouse for swift and logical flow of goods, Merchants Terminal Corp., Landover, Md., installed a unique cold-storage door system. And it has incorporated many other advanced features.

The new entrance-and-exit system achieves three important benefits:

1. **It increases handling efficiency.**
2. **Cuts costly refrigeration loss.**
3. **Increases personnel safety.**

And to take full advantage of mechanized handling and palletized storage, the entire operation is carried out on one floor.

Here's the layout that does the job without waste motion or delay.

Single Set of Doors

Usual practice in warehouse design is to install a row of single or double-leaf doors down the corridor on both sides. But with our arrangement (developed in cooperation with Jamison Cold Storage Door Co.), products going in and out of the main freezer rooms pass through just one set of in-and-out doors on each side of the main traffic corridor.

Each door grouping consists of two large horizontal sliding doors, four vestibule or batten doors, two wicker doors built in the sliding doors, and a personnel door between them.

In-and-out doors are side by side and centrally located in the corridor.

These provide only one entrance and one exit to each of the two large cold storage rooms—exclusive of two personnel and two safety doors. All traffic is one way, thus offering added safety.

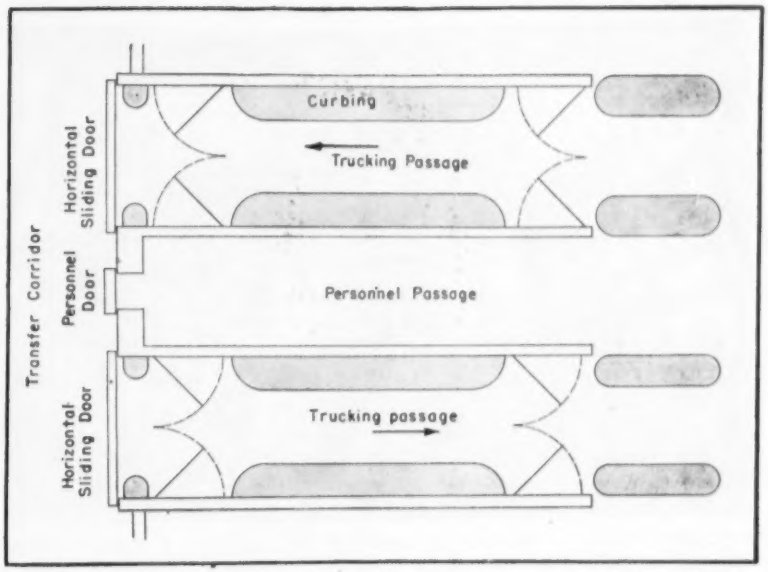
This single entrance and exit system of cold storage doors costs considerably less to install than the standard arrangement of many hinged doors. Resulting, too, is greater handling efficiency because it is better adapted to fast, mechanized traffic.

Shipments of 1,000,000 lb. or more have been moved through one set of doors in 12 hr. Fork lift trucks move through the new door system as fast as 5 mph. Speed of these trucks is such that they can cover the distance from one end of the central traffic corridor to the other with safety in a matter of seconds.

Another important advantage of this limited access is that it reduces costly refrigeration loss from in-and-out traffic that would normally flow through many doorways. Naturally, the fewer the doorways, the less chance of cold air escaping when the doors are opened. Net result is to minimize the amount of refrigeration needed and ease the problem of defrosting coils. This new sealing system cuts in half the time and effort spent de-icing coils.

Furthermore, a specially insulated and air-conditioned vestibule within each entrance and exist system removes moisture from the air, preventing formation of ice on inner surfaces.

With entrance and exit doors side by side, outside air pressure is the same on both doors. This avoids cross-room convection which ordinarily increases the refrigeration load. In the long run, passage of incoming and outgoing products through separate doorways causes less confusion and allows better inventory control.



PARALLEL 30-ft. vestibules on both sides of transfer corridor lead to freezer rooms. Drawing shows layout of one-way vestibule doors, sliding horizontal doors, trucking and personnel passages.

Horizontal Sliding Doors

On the corridor side of the in-and-out grouping are four horizontal sliding doors, each sealing an opening 8 ft. wide by 9½ ft. high. These doors overlap 4 in. on both sides of the doorway and 4 in. at the top. They are closed at night and over weekends, but during the working day they are kept open to permit movement into the storage areas and out.

Built into some of the big sliding doors, which close off both entrances and both exits, is a little wicket, or personnel safety door. Through it warehousemen leave and enter cold storage rooms without having to open the sliding doors, which generally are extremely difficult to open from the inside.

Use of sliding doors practically eliminates maintenance problems,

OUTSIDE switches illuminate cold storage rooms. Switches on exit side turn them off.

CAPTIVE stacking trucks pile palletized load high in storage area, making maximum use of available space.

INCOMING fresh merchandise is moved by lift truck into a quick freezing tunnel that operates at —40 deg. F.

since under normal conditions the doors are used only twice a day—once in the morning when they are opened, and again at night when they are closed. Opening and closing an 8 ft.-wide door on hinges many times a day causes serious wear on the gasket. Another problem with such a heavy door is keeping hinges in alignment. Important also from the standpoint of cost is consideration of building structure to support heavy doors that swing.

Finally, a hinge-swung door takes up a lot of space when it is opened. This could slow traffic, endanger personnel, and prevent erection of safety piers in the corridor outside the door. And a vertical sliding door would not serve as well because of the ever-present danger of a cable breaking.

One-Way Batten Doors

Inside each entrance and exit are two sets of one-way vestibule or batten doors at the near and far ends of a 30-ft. vestibule. First set is just inside the sliding door on the entering side, and far enough away on the exit side to give adequate clearance between the sliding door and open batten doors when merchandise is taken out. Second set on each side is at the terminus of the corridor opening into the freezer rooms.

Design of the vestibule combination permits passage of a fully-loaded lift truck and trailer, each carrying two pallet loads. In this way, it is possible for a lift truck operator to convey 8,000 lb. of merchandise through the door system in one load.

As a rule, relatively small trucks deliver and remove loads from the cold storage rooms. Once deliveries for storage are inside the rooms, an operator in an electrically heated suit stacks the palletized loads with a large captive stacking truck. Use of these heavy-duty stacking trucks for palletized loads simplifies handling considerably.

Trucks enter and leave the cold storage rooms merely by banging open the batten doors, which have bumpers of heavy spring steel to absorb the impact. These doors provide a tight seal from the warm air in the central traffic corridor.

Eliminating Moisture

The 30-ft. vestibule is insulated and air conditioned between the batten doors to remove moisture from air that rushes into the cold storage areas when the doors are opened. Pipes carrying warm oil are built into the concrete wearing floor underneath the vestibule to prevent formation of ice on the floor.

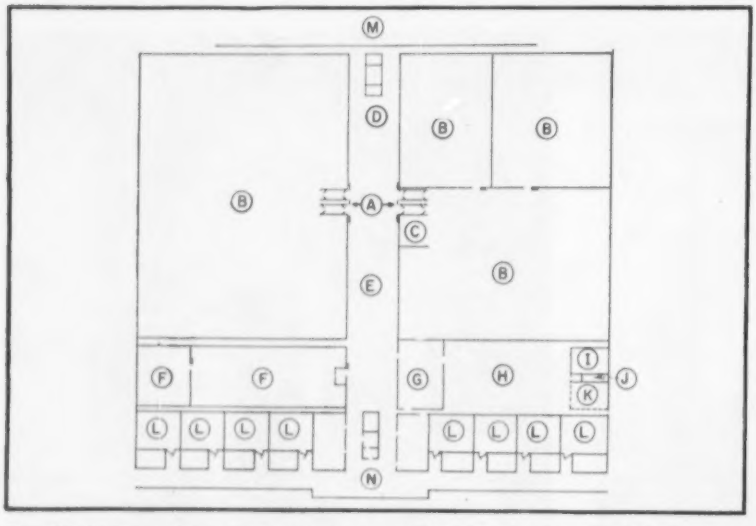
Under this 7-in. thick concrete flooring is a 4-in. layer of corkboard and a second concrete layer 12 in. deep. Air in the vestibule is dehydrated so that any condensed moisture in the air is evaporated by the warmth of the floor.

Metal clad plywood with corkboard insulation is used for the entire wall of the vestibule. This bright metal surface is vapor tight. Under normal circumstances, the wall would be made of plaster and cork, which is more subject to physical damage.

Protecting Personnel

Concrete piers on the corridor side and store room side of each entrance and exit have armor reinforced corners to guide the fork lift trucks. Also, inside the vestibule and down both sides, is concrete curbing wide enough for a man to stand on in case he is trapped in the passageway by an incoming or outgoing truck. Piers and curbing are designed to further safeguard personnel and prevent damage to both equipment and merchandise.

Though it is possible for workmen to leave and enter the freezing rooms through the trucking passageways, a personnel passage is provided in between. This is another safety pre-



Simplified floor plan of Merchants Terminal cold storage warehouse. Key: (A) In-and-out door arrangement, (B) freezer storage, (C) freezing tunnel, (D) checking offices, (E) traffic corridor, (F) cooler storage, (G) truck battery room, (H) refrigeration equipment room, (I) boiler room, (J) pallet steaming, (K) transportation space, (L) freezer rooms, (M) railroad platform, (N) truck platform.

caution. After working hours, the only way to get in and out of the freezer rooms is by way of the personnel door which opens between the two large horizontal sliding doors on the traffic corridor side. Such safe and easy access is important to the watchman on duty.

Special Lighting Control

An elaborate lighting system controlled by push buttons at both the entrance and exit doors makes it possible for the truck operator to light any part of the freezer rooms he desires—without getting off his truck. He merely picks the spot or spots he wants illuminated and punches the light switches with a gloved fist.

An incoming operator can light up any bay in which he wants to work. A flick of the button on an easy-to-reach panel throws front and rear floodlights on entire bays. When he has finished working, the outgoing operator can turn off the lights just as easily on a separate panel arrangement.

The Landover warehouse, built for sub-zero storage and quick-freezing, is the largest plant in the world refrigerated with Freon, and one of the largest cold storage warehouses in the U. S. It measures approximately 400 x 485-ft. and has more than 2 million cu. ft. of storage space. This gives the plant a storage capacity of over 30 million lb.

Basically, the new warehouse is square, with a truck platform and railroad dock at opposite ends of the building. The truck platform alone serves as many as 42 trucks simultaneously. Connecting the truck and railroad loading docks is a 50-ft.-wide central transfer corridor. Thus merchandise received at the railroad platform can move straight through the warehouse to the truck-loading platform. Checking offices at both ends of the corridor record all incoming and outgoing shipments.

Other Advanced Features

This turnpike-like service corridor and checking office system permit exact control over product inventory. Pallet men keep a more accurate record of goods stored by checking pallet loads. Traffic conditions are also improved on the 20-ft.-wide truck and railroad platform, since empty pallets and other storing equipment can be

(Turn to page 188)

● ● ●

By switching from irregular to . . .

. . . shirred casing

. . . franks are more uniform and output is up 25%

Smooth-Fold Casing—Faster Stuffing

REPEATEDLY, sausage makers have been devising improved techniques for making quality skinless frankfurters.

And with the latest casing for stuffing wieners, product uniformity is being achieved with marked new consistency by Marhoefer Packing Co., Chicago. Used here are specially shirred cellulose casings, specifically, Wienie-Pak "Smoothies," developed by Transparent Package Co. (Tee-Pak), Chicago.

The new shirring is designed to eliminate former casing-fold irregularities—"valleys" and "peaks"—tending to show up in materials previously used. Note (photos above) how the newly developed casing folds neatly into regular shallow pleats.

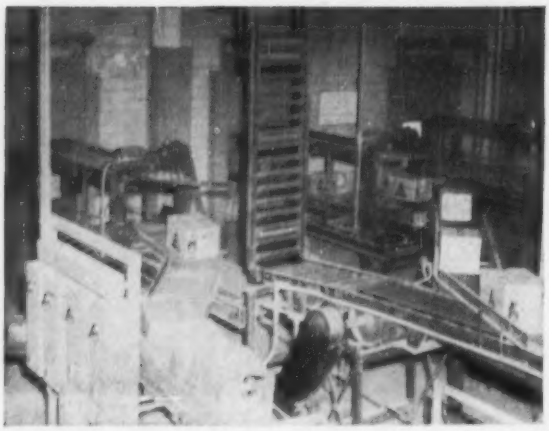
Ever on the lookout for quality improvements, Marhoefer launched tests to determine if the new cellulose casings would assure maximum product uniformity.

Not only did the shirred product provide this quality-conscious firm with a better frank but it also significantly simplified—and so stepped up—the wiener stuffing operations.

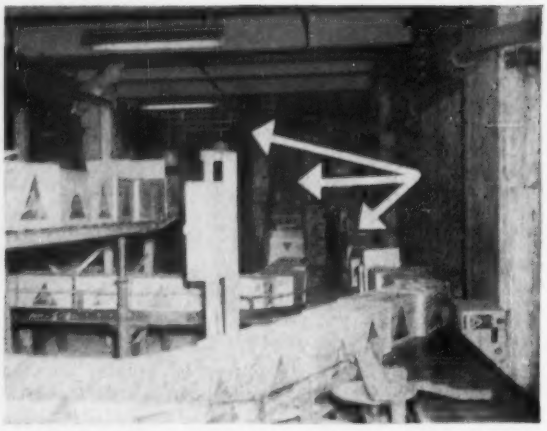
Casings now are slipped onto stuffing horns easier and thus more rapidly. And, at Marhoefer, one man now stuffs 1¼ caddies of casings (a caddy containing 50 strands of 50-ft.-long casings) in the same time that it formerly took him to stuff one.

What's more, employees prefer using the new casing because it facilitates their task.

Here empties ride in from trucks . . .



1 **CASES OF EMPTIES** quickly move in from trucks at 15 dock-spots (beyond wall). Some 75% go directly to filling lines, remainder to storage areas.



2 **LINES** of incoming empties destined for immediate use converge into belt conveyors (arrows) that carry bottles to 2nd-floor soakers.

Complex Handling *Simplified* In Multi-Story Bottling Plant

Ingenious system of conveyors speeds empties off trucks, whisks "fulls"—in a wide variety of packages—right on. "Clockwork" flow, traffic-controlled, does it. Engineered storage facilities smooth performance

JOHN K. BAYLISS
Superintendent of Bottlehouse, Blatz Brewing Co., Milwaukee

It's a relatively easy matter to run loads of bottles off trucks, into a plant, through filling lines, and then back out onto the same trucks—when you're handling just one size bottle.

But how is this going to be done simply and efficiently using a single dock location when a great number of different-size containers, both cans and bottles—250 kinds of packages in all—must be trafficked? And with strategic storage also figured in?

This was the complex materials-handling teaser that had Blatz executives scratching their heads. Astute planning—plus—would be called for to resolve it.

What made the problem even more vexing was that a continuous handling system had to be devised in this brewer's multi-story Milwaukee bottlehouse, wherein there are nine packaging lines (two for cans and seven for bottles). What's more, the bottlehouse stands on a sloping lot and so is three stories high on one side and four on the other.

Simultaneously In and Out

Company planners rolled up their sleeves—and finally came up with an impressively efficient arrangement of movers that works in this manner:

Trucks and trailers back into a 15-vehicle ground-floor dock that is enclosed and automatically ventilated. Here, flexibility has been so engineered that empties may be simultaneously unloaded from six trucks while cases of bottled or canned beer may be loaded into the remaining nine trucks.

As for unloading empties, a retractable, pushbutton-operated aluminum conveyor—a 30-footer of belt and roller type—is extended to the truck through a 30x40-in. sliding door in the outside wall of the building. Fast and easy unloading is achieved by extending this electrically-operated conveyor into the truck.

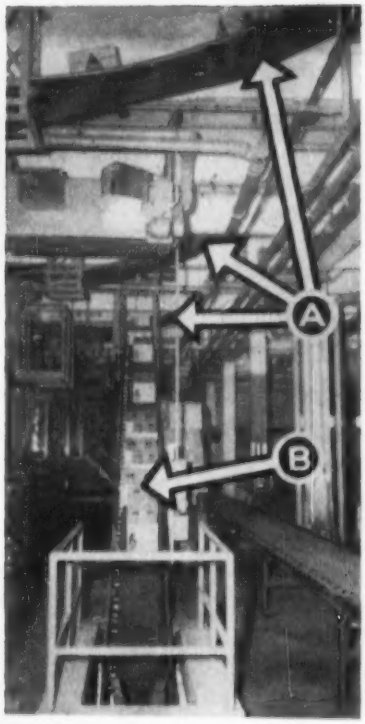
All told, there are 15 retractable conveyors—9 serving as lines for loading and the remaining 6 for either loading or unloading. Built into each of the latter combination lines is a 4-ft. "raising-lowering" type roller conveyor (slightly curved). Attached to a supporting rectangular frame, this counterweighted conveyor, when in lowered position, transfers cases of empties from the retractable belt to either basement storage or second-floor bottle soakers. When raised, it permits direct loading of outgoing filled cases to the retractable conveyor and thence to the truck.

Approximately 25% of incoming empties are belt and roller-conveyed to basement storage, where space is allotted for about 300,000 cases along eight gravity-roller conveyors running the length of the area. An inclined

. . . and here "fulls" ride out—to same trucks

3 ON NEW LINE, filled cans are automatically placed in gold foil-laminated cartons (6's) that are then packed eight to a case.

5 MERRY-GO-'ROUND on 1st floor receives cases from the three 2nd-floor belts to direct them to 1st or ground-floor storage or directly onto trucks. Bars across conveyors prevent case-colliding.



4 THREE BELTS (A) of nine bringing cases down from 3rd-floor filling lines. Each set of three converges into one—as at (B).

6 RETRACTABLE CONVEYOR facilitates loading of filled cases or unloading of empties. Here "fulls" are going into a truck.

booster belt is built into each of the eight conveyor lines for ground-to-basement floor delivery of empties. speed of each conveyor is 125 ft. per min., and over 1,000 cases of empties can be unloaded from each line every hour.

Provisions have also been made for handling and storing mixed loads of empty bottles. Installed for this purpose are two roller conveyors suspended over the eight 200-ft. basement conveyors. Cases of empties are removed from any incoming line, transferred to one of the overhead cross-conveyors, and then taken off for storage in a designated aisle space.

Three-Quarters to Bottling

Generally, about 75% of incoming empties pass up basement storage to continue directly to bottling lines. And, when needed, cases of basement-stored empties are loaded onto the same conveyor that carried them in. These, and incoming empties of the same size, converge from any of the eight lines onto three belt conveyors (with flights) that elevate them to the second floor.

Where two or three of the basement conveyor lines merge into one, "traffic cops"—bars across the conveyors that automatically open and shut—prevent collision of cases. As one bar opens to permit a case to pass through, the other automatically locks to stop the case behind it. Then when the path is clear, the locked bar opens and lets the following case behind continue.

On the second floor, cases of empties are diverted onto roller conveyors feeding seven bottle soaking-washing machines. Here, bottles are manually loaded into the soakers, while empty cases remain on the conveyor for re-use further along at the case-packing stations. Those empties that are not suitable for re-use are tossed onto a ceiling-suspended conveyor that carries them into an enclosed baler room for disposal.

As for cases of empty cans, they move into the building in the same manner as bottles. Only difference is that they come in at only four unloading spots and 90% pass basement storage to continue to the two canning lines.

By drop-dispensing liquid soap onto flat-top chain conveyors in the bottling room, friction of the chains sliding under scrambled-up bottles is reduced to a minimum. This proves especially

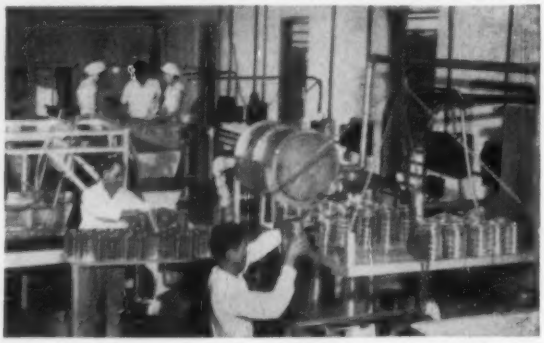
helpful at the in-feed to fillers, cappers, and labelers. Another thing: The soap solution keeps the bottoms of bottles clean.

Bottles then continue in normal fashion through the third-floor 60-spout rotary filler (300 per min.), capper, pasteurizer (45-min. travel), and five tandem labelers. Now, on the way to the case packer, five lines of bottles from labelers converge into two. Bottles then automatically drop into empty cases—used ones coming from the front of the soakers and new

(*Turn to page 188*)

• • •

CLOSEUP shows fruit's variety of sizes, shades. It is picked green when at peak of "C" content.



MODERN plant processes fruit quickly to forestall vitamin loss. Juice is pasteurized, then canned.

ACEROLA: Super Source of "C"

It takes very little of this Puerto Rican juice—boasting 80 times the vitamin C content from oranges—to fortify various juices, other foods

MOST POTENT natural supplier of vitamin C yet discovered is the acerola, a small cherry-like fruit native to Puerto Rico. And—very important—it now can be processed on a large scale for employment as a food additive.

Today, the acerola juice is finding use as a blending agent for various marketed fruit juices. Even when diluted 10 to 1, its "C" content is high enough to bring them up to the level of orange juice, or greatly enrich orange juice itself.

And since so little acerola juice need be employed, the taste qualities of such products as apple, pear, pineapple, or tomato juices are not affected.

Further, it can be used in the making of jellies and jam to augment their nutritional value.

Also, storage life of the product is excellent.

The acerola is a fleshy, pleasantly tart fruit. Its color varies from a yellowish-orange to a deep red when ripe, but vitamin content is highest in the green fruit. Sharp drop in the vitamin occurs shortly after picking, so it must be processed quickly to forestall loss. Although it would be desirable to export the fruit, it is too perishable for such enterprise.

Extraordinary "C" content of the unripe fruit—up to 4,000 mg. per 100 cc. of juice—was first revealed in 1946 by Dr. Conrado F. Asenjo at the University of Puerto Rico's School of Tropical Medicine in San Juan. Comparing with other common sources of the vitamin, 6 oz. of acerola juice is the equivalent of 15 qt. of orange juice or 50 lb. of fresh raw cabbage.

Large-scale production of the juice was only recently assured. Problem lay in achieving suitable cultivation of the small bushy tree, which has grown wild in Puerto Rico for over 2,000 yr.

In the wild state the tree develops hardiness and immunity to practically all disease. It withstands extremes of weather and insect attack. But when the same healthy tree is planted in a field close by hundreds of others of the same species, it loses its ruggedness and resists commercial cultivation.

In cooperation with the BiB Corp., Lakeland, Fla., the Puerto Rico Agricultural Experiment Station launched an acerola program. And finally a suitable variety was developed with desirable fruit-bearing and easy fruit-picking characteristics.

When the crop was established on a commercially practical basis, a canning plant was built adjacent to the plantation. Current success of this plant supports predictions of a new industry important to Puerto Rican economy in providing a major cash crop.

Fruit is picked at the peak of its vitamin content and quickly processed to yield a stable canned juice. Although the fruit is very perishable, the pasteurized juice retains about 85% of its vitamin potency after 1-yr. storage. High retention is attributed to the high acidity of the juice.

Diet Aspects Briefed

Low vitamin C levels in the diet are generally ascribed to high cost or limited seasonal availability of fresh fruits and vegetables.

Even when these are readily at hand, vitamin C often is destroyed in many foods through wilting, chopping, crushing, drying, cooking, and storing.

Recommended daily intake: Adults, 75 mg.; children, 30-75 mg.

Since the human body cannot synthesize "C" and has little capacity for storing it, a daily intake is essential to good health.

Simple System Levels Buckled Freezer Floors

Electric heater elements beneath floor insulation thaw frozen earth, economically correct buckling . . . Low "holding" current prevents refreezing

A. W. RUFF
Vice-President & Secretary, V. C. Patterson & Associates, York, Pa.

Easy and economical lowering and leveling of freezer-room floors that have buckled from earth heavage—plus protection against rebuckling—is assured by a method we've recently developed.

Without interfering with use of the room, electric heating elements are placed permanently under the insulated floor slab. When current is applied, they warm the earth and melt ice formations. Thus, floor and building gradually settle back to normal, whereupon current may be reduced to a point just sufficient to prevent refreezing.

Among companies reporting successful application are: Frozen Food Locker Co., Chestertown, Md. (locker plant); Whiteford Packing Co., Whiteford, Md. (freezing plant); Eisenhart's Dairy, York, Pa. (dairy & ice cream plant); and Harrisburg Ice & Cold Storage, Harrisburg, Pa. (cold storage plant).

Heavage difficulties are apt to occur when freezer rooms are built on the ground floor without special precautions to prevent under-floor freezing. Usual cause is under-floor formation of ice pockets that expand as the earth is chilled. This action creates pressure that cracks the floor and lifts building support columns, as shown in the photo.

Positive preventive is to add heat artificially. In new construction, it's commonly done by building pipe grids for warm-fluid circulation, or by laying in air file or ducts. But in an existing building, the cost entailed in putting the room out of service, tearing up the floor, and reconstructing it with a warming system is high. And it's often impossible from an operating standpoint. Accordingly, our target was this simple system.

There are two ways to install heater units beneath the floor: (1) Pushing pipes under the floor horizontally and inserting heater elements (Fig. 1); and (2) sending pipes through the floor vertically and locating heater elements at the proper level (Fig. 2).

The first method involves a "custom" job for each application because of the many variables. Inserting the pipes can be difficult if proper techniques, according to type of soil or fill, are not followed.

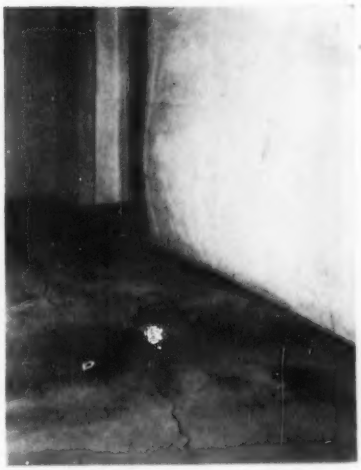
At times a hydraulic jack, backed up by cribbing, may be used. In other cases, a water lance located inside the pipe is the best solution. Or drilling may be the only way.

Second method is used only when location of the building makes the first technique impractical or uneconomical. Here, stored items may have to be shifted. Also, dust of the drilling can be a problem, although vacuum pumps usually eliminate this objection.

However, heating units, selected with respect to arrangement and capacity, usually lower the floor in about three months. And in the case of a small ice cream hardening room, high heat application did it in less than three weeks.

In an accompanying table, economy of the new patented system is compared with the cost of replacing a 100x60-ft. freezer floor. Removing and reconstructing the buckled floor is estimated at $5 per sq. ft. But use of heating elements indicates an annual saving of $1,435, or nearly half the cost of floor replacement. And for smaller areas, costs would be comparatively less.

In addition, the freezer can be operated continuously at full capacity.



BUCKLING caused by ice formation under insulated floor. Note large crack in floor, bowed effect on wall.

Costs—Old vs. New

Replacing Old Floor:	
Investment ($5 x 100 x 60)	$30,000
New System, Using 20 Kw. of Heat for 3 Months:	
Construction ($8,000)+ power cost @ 20 kw. x $.025 x 90 days x 24 hr. ($1,080)	$9,080
Annual Carrying Charge @ 10%	
Replacement method	$3,000
New system ($908)+ anti-freeze current @ 3 kw. x $.025 x 24 x 365 ($657)	$1,565
	Saving $1,435

Techniques in Typical Plants

Job	Room Size (Sq. Ft.)	Heat Applied (Watts)	Total Kwh.	Time to Lower (Days)
Food locker	470	1,600	2,304	60
Food locker	7,800	25,200	33,264	55
Dairy freezer	6,600	30,400	54,720*	75*
Frozen food plant	3,600	10,400	18,720	75
Food locker	1,260	4,200	7,560	75
Frozen food plant	1,200	3,200	6,528	85

* Estimate

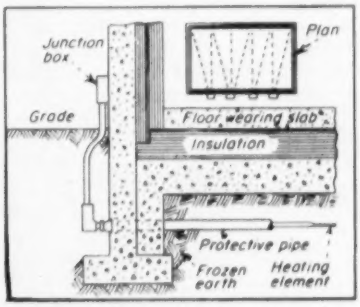


FIG. 1. HORIZONTAL. Heater elements in conduits beneath insulated floor to keep earth from freezing.

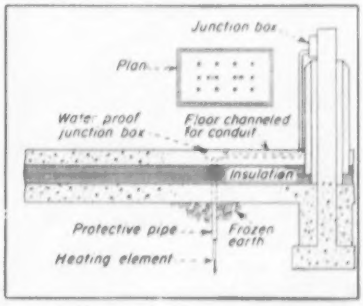


FIG. 2. VERTICAL. Here, heating units are set at proper level in pipes piercing the floor.

TEN ACRES contains hatchery, processing plant, and offices of Snake River Trout Co. At left are trout feed warehouses, a sharp freezer, freezer storage structures, workshop and shipping, and trout processing facilities. Buildings in foreground are company offices. At right is hatchery building.

Trout Rushed From "Farm" to Freezer to Package in

Top-Quality Fish Operation

Freshness accented by slashing time between water and 30-below room, thus curbing deterioration that plagues average fish processor

PHILIP D. SHEA
Asst. Manager, Snake River Trout Co., Buhl, Ida.

Packaged frozen trout—from egg to consumer table. This is the approach to fish quality control taken by Snake River Trout Co., Buhl, Ida., processor of "Tingey's 1,000 Springs Rainbow Trout."

The company raises its own raw material, then it grades, dresses, sharp freezes, glazes, and packages the fish in retail and institutional sizes.

Trout are hand selected according to size while still alive in the pool. They are dressed by hand using stainless steel processing equipment, graded again for size, rinsed, and then placed in aluminum trays for freezing.

The company's ammonia freezing plant consists of three compressors, two sharp freezers, and three storage rooms. Aluminum trays filled with trout are placed on fixed plates and frozen at −30 deg F. Freezing time is usually 2 hr., but fans circulating the air may speed the process.

Trout are removed from the trays by dipping in water—a step which gives them their first glaze. Then they are glazed a second time for double protection. Average daily output of the freezer is 2,500-lb. of trout, though it can produce as much as 3,000-lb. daily.

Next stage is packaging of the fish, in both institutional and retail sizes. Former are wrapped in cellophane with white brush lettering. For the retail-size waxed cartons there are cellophane window-type overwraps (Shellmar-Betnar Div. of Continental Can Co.).

Product is shipped to distributors in company-built freezer cases of special design. These will ship five to six days on 10-lb. of dry ice. Large consignments travel by refrigerated truck.

Established in an area noted for its excellent springs, the company uses over 40,000-gal. of water per minute to supply 44 concrete trout-rearing ponds, covering four of the plant's ten acres. Each pool receives spring water averaging 58 deg. F. and rated as drinkable by the state.

Value of the fish farm is placed at $250,000, and the cost of raising a pound of trout approaches 68c.

Producing the Raw Material

Rainbow trout eggs, purchased from hatcheries specializing in egg production, cost $2.50 per thousand and up. Approximately 500,000 eggs are necessary to produce 100,000 lb. of trout, making the annual investment in eggs over $6,000.

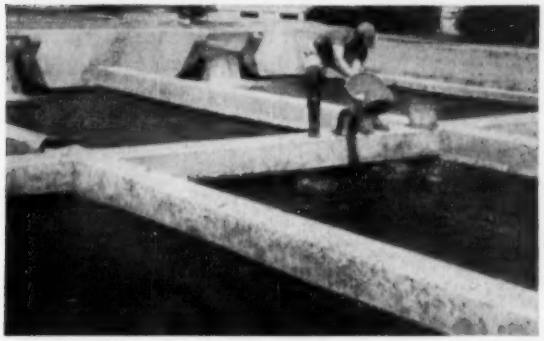
Four pounds of fish feed (@ 4c. per pound) are required to produce 1 lb. of trout. In a peak season, the company may use as much as 12,000-lb. per day. In addition, 300,000 lb. of hard wheat is processed annually in the company's hammer mill and blending machines, along with 40 tons of cotton meal, 40 tons of fish meal, 30 tons of whey, 15,000 lb. of brewer's yeast, and miscellaneous items like vitamin B-12 and antibiotic food supplements directed at proper balancing of the trout diet.

The meat products used in the trout diet are processed through a butcher shop, which handles over 2,500 carcasses annually. There is no waste. Every part is used, byproducts being sold to a rendering company. Over 10,000 lb. of meat scraps and 12,000 lb. of non-game fish are purchased weekly.

Personnel requirements of the company are small. It's staff of 20 includes 15 hatcherymen: 8 to process fish, 4 to prepare fish food and feed trout, and 3 to maintain facilities. Moreover, there are 1 foreman, 1 traveling sales representative, and 3 office workers. Annual personnel cost is $90,000.

In 1954, the company plans a bumper crop of 500,000 lb. of rainbows, with an estimated expenditure of $300,000.

Down the Line: Feeding, Cleaning, Freezing, Glazing, Storing, Shipping



1 **HUNGRY TROUT** in concrete pool are on receiving end of a bucket of well-ground meat.

2 **HATCHERYMEN** gut, clean, and wash trout, fresh from rearing ponds. Fish are graded twice.

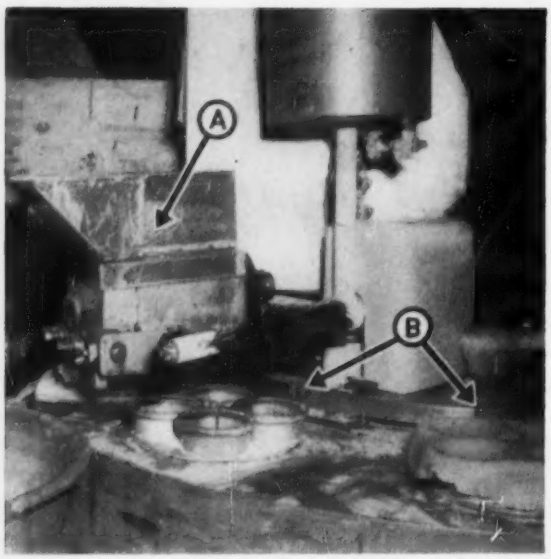
3 **TRAYS** are covered, placed on freezing plates. Trout are sharp frozen at —30 F. in 2 hr.—faster if air is fan-circulated.

4 **AFTER GLAZING,** trout are wrapped on semi-automatic machine.

5 **MASTER CARTONS** in storage. Sizes are stenciled on boxes.

6 **SHIPPING CONTAINERS** are specially-designed and built by company. Ten pounds of dry ice will keep trout for six days.

1 Homemade lift costs only $200. Hoist-operated it carries materials from basement to 1st floor.



2 Dispenser (A) automatically deposits pie filling in sets of four molds. Lugs (B) actuate machine.

Little Things That Count

With His Own Innovations Enterprising Baker Makes Progress All Along His Line

Low-Cost Elevator
Automatic Pie Filler
Baking-Time Controller
Whirlwind Cooler
Magnetic Tin Remover
Pneumatic Pie Baggers
Blueberry Cleaner
Portable Dough Bins

JOHN V. ZIEMBA
Associate Editor, "Food Engineering"

Shop-engineering production-line gadgets can do a lot to reduce costs and improve control of quality.

This is strikingly demonstrated on the 10c.-pie line at Neal Bort Pie Co., Duluth, Minn. Device-planner for this small company is Neal Bort, the production manager, who pitches in with his personnel in turning out the ten-centers.

Let's spot eight of these Bort-designed innovations on the production line and see how they prove helpful—by cutting costs, improving uniformity and quality of pies, reducing down-time, or simplifying operations—

1—Low-Cost Elevator

Machine-shop built, at a cost of about $200, was a simple lift for moving basement-stored raw materials to the 1st-floor processing area. Lift comprises a 1-ton electric chain hoist mounted on top of a 7-ft.-high, triangle-shaped, angle-iron frame, with a plank wood floor (3½x5 ft.).

Vertical angle-iron sides (1½ in. wide) of lift frame ride along a pair of stationary tracks extending from basement to 1st-floor ceiling. Bolted near top and bottom of these sides are pairs of 1½x6-in. metal bars (one on each side) to guide the travel along the stationary tracks.

Hoist chain—for raising and lowering the lift—is attached to a 1½-in. metal cross-bar, atop the lift frame. Secured to the top of still another cross-bar is a 6x18-in. swivel board with a short ½-in. rope. Pulling the rope tilts the board, which then trips the hoist motor to start or stop the home-made lift.

2—Automatic Pie Filler

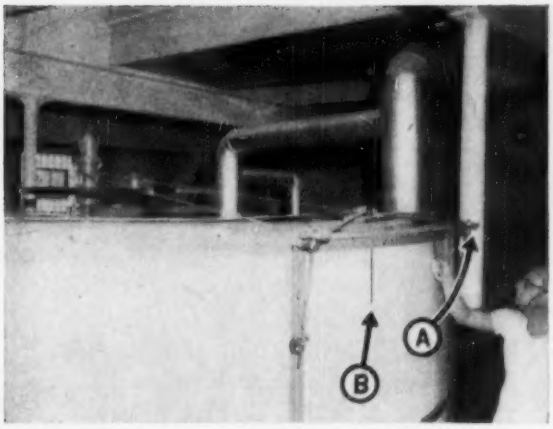
Machine-shop built was a fully automatic pie-filling dispenser that has abolished former hand methods and improved both accuracy and sanitation.

This new stainless steel unit is mounted over the rotary pie machine, adjacent to the dough sheeter. It comprises a 3-gal.-capacity rectangle-shaped hopper that gravity-feeds fillings into two pairs of 2-in.-dia., adjustable cups (volumetric fillers) that are cast, in a perpendicular position, in 4x8-in. revolving cylinders. The gear-driven cylinders are actuated by movement of a sprocket with alternately small and large notches.

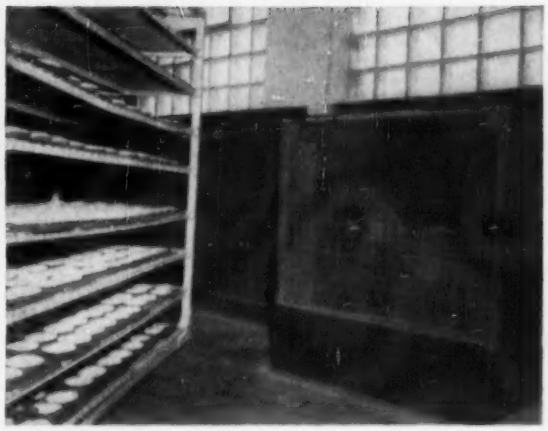
Vertical, case-hardened stainless steel rectangular lugs (½x1x2 in.), are mounted on the rotary pie machine, one alongside each set of four 4-in.-dia. pie molds. Each lug, in turn, trips a small vertical, spring-attached metal arm that rotates the sprocket one notch.

After each move that it thus gives cylinder, the arm springs back into position, ready to be pushed forward again by the next lug.

Filling sequence is in this manner: A cylinder's cups first receive pie filling, gravity-fed from hopper. Next, arm moves sprocket a small notch. As it does, cylinder rotates short of halfway around. Meanwhile, a set of four empty pie molds passes below dis-



3 Baker knows pies are done when hook-on bar (held in hand) moves on rope from pulley (A) to mark (B).



4 Cutdown airplane propeller (behind screen, right), cools racked pies within an hour.

5 Fed pies placed upside-down, unit picks up tins with magnets in belt-driven shaft (right).

6 Pneumatically-Operated bag openers (arrows) speed up pie-bagging on fast packaging line.

penser. They do not receive filling but get pie tins and bottom-dough sheet farther along. But when arm moves sprocket a large notch, the cylinder completes the full rotation, dropping filling (3-oz. portions) from the volumetric cups into the next set of four pie molds—this time containing pie tins and bottom-dough sheet. Cycle then repeats.

Pies then continue to sheeter to receive the top dough sheet. Girl feeding pie filling to the dispensing unit also places pie tins into each alternate set of four pie molds, which continues to the same dough sheeter to get the bottom-dough sheets.

Alternate sets of molds—one with just the bottom-dough sheet and the other ready-to-bake pies—continue to the next station. Here, on a revolving drum above the pie machine, two pairs of sponge-rubber-topped (2-in. dia.) metal arms tamp bottom-dough sheet into four pie tins.

Then, as drum makes a half revolution, two pairs of gas-heated, 4-in.-dia. dies trim off excess dough from the next set of oven-ready pies, crimp-sealing the edges at the same time. Each alternate set of ready-to-bake pies is then hand-forked off molds and onto portable racks.

Meanwhile, the other set of molds with only bottom-dough sheet, continues to filling dispenser, and the alternate set of empty pie molds then receive pie tins and bottom-dough sheets. And the cycle repeats.

3—Baking-Time Controller

Another simple, yet efficient time- and quality-saving device is an oven timer. It consists of a rope line (clothes line) hooked up in triangular fashion to the vertical central shaft revolving the tray oven and to two pulleys mounted on ½-in. metal rods bolted to the side of the oven.

Oven shaft moves rope line clockwise. Rope slack is taken out by a ¼-in.-dia. spring attached to a third pulley about one-quarter the distance between one of the oven-side pulleys and the central shaft. Other end of spring is secured to the opposite oven-side pulley.

Timing of the operation proceeds in this manner:

After feeding a batch of pies into the oven, attendant places a 1x6-in. hooked metal bar on rope next to pulley nearest oven door. Then, as bar moves along rope (from right to left in photo), it reaches a black stripe painted on side of oven—a signal that the oven has made three revolutions and pies are baked, ready for unloading.

This simple timer now enables worker to carry out his other chores—mixing and then feeding dough into the divider.

What's more, the worker loses no time in running around to the front end of the oven to see how his pies are progressing.

4—Whirlwind Cooler

Three factors prompted Mr. Bort to build a simple pie-cooling system adjacent to the packing line. The cooler for conditioning pastry dough is not of sufficient capacity to permit cooling of racks of hot pies. Moreover, it is located too far from the pie-packaging line, and it results in unwanted criss-crossing of traffic.

Hot pies that now come out of the oven are loaded onto 9- or 18-shelf portable racks that are pushed in front of a company-built, blower-type cooler. Unit consists of an airplane propeller, cut down from its original 6 ft. dia. to 2 ft. Wire-screen guarded, it is driven by a 3-hp. motor that turns it at 1,750-rpm. Pies are cooled within 1 hr.

5—Magnetic Tin Remover

Engineered on the pie-packaging line is a novel arrangement of permanent magnets that have played a significant role in enabling this firm to bag 500 dozen 10c. pies hourly—and with the aid of only four girls.

Unit in question is pie-tin remover that can be mounted over the feed-end of the packaging table within a few minutes. It comprises a 3-ft. endless-belt conveyor (canvas) riding over two horizontal rotating shafts—one of 4 in. dia. and the other 15. Part of the larger shaft consists of two 4-in. permanent magnets spaced 1 in. apart. This shaft is mounted about 5 in. above the packing conveyor.

Driving the pie-tin remover is a 4-in. belt attached to the larger shaft and a pulley below the packing table. Motivating this pulley is the chain-belt driving the 20-ft. packing conveyor.

A smaller, 4-in. shaft slides into a pair of 3-in. slots—one on each side. By adjusting the shaft inside the slots and then securing it with nuts and bolts, conveyor-belt slack of pie-tin remover can be taken up.

In operation, pies are fed to the packing belt, tin-side up, by one girl. Then, as they pass under the pie-tin remover, tins are picked up by the magnets and cling onto the lower part of the tin pick-up belt. Tins are then carried around the larger shaft and then go back to the smaller shaft (opposite to direction of travel of packing conveyor).

At this point, pie tins drop into a stainless steel, V-shaped chute (4½ in. x 3 ft.). Set at right-angles to pie tin-remover belt, the chute discharges the empty tins into a box.

6—Pneumatic Pie Baggers

Additional output-boosters on the packaging line are the four pneumatically-operated bag openers. Each consists of a 3x4x12-in. galvanized metal box mounted flush to packing boards along each side of the bagging con-

(Turn to page 163)

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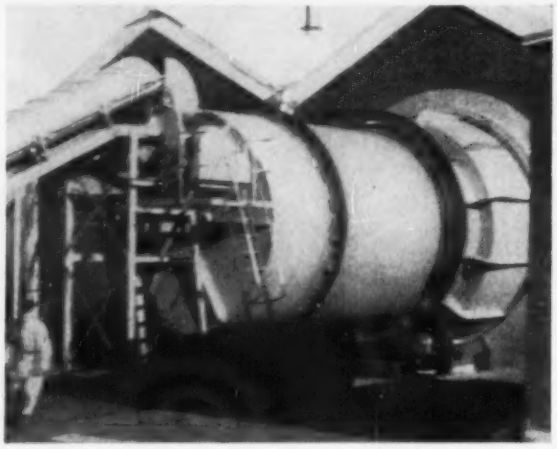
Food Wastes Made Into Profitable Product

Process employs bacterial cultures to convert discarded solid to readily salable soil-improving compost



LARGE-SIZE reducing mill reduces food-plant refuse to pulp, thus enabling bacteria to break it down rapidly.

HENRY S. BONDI
Elmhurst, N. Y.

That solid food plant wastes may be disposed of profitably by converting to compost is indicated by results of a number of trial operations using a recently introduced process.

▶ **In these runs, citrus pulp, corn cobs, fruit and vegetable refuse, coffee grounds, and non-metallic packaging materials, including non-phenolic plastics, were successfully composted.**

Process also is seen applicable to other food plant wastes.

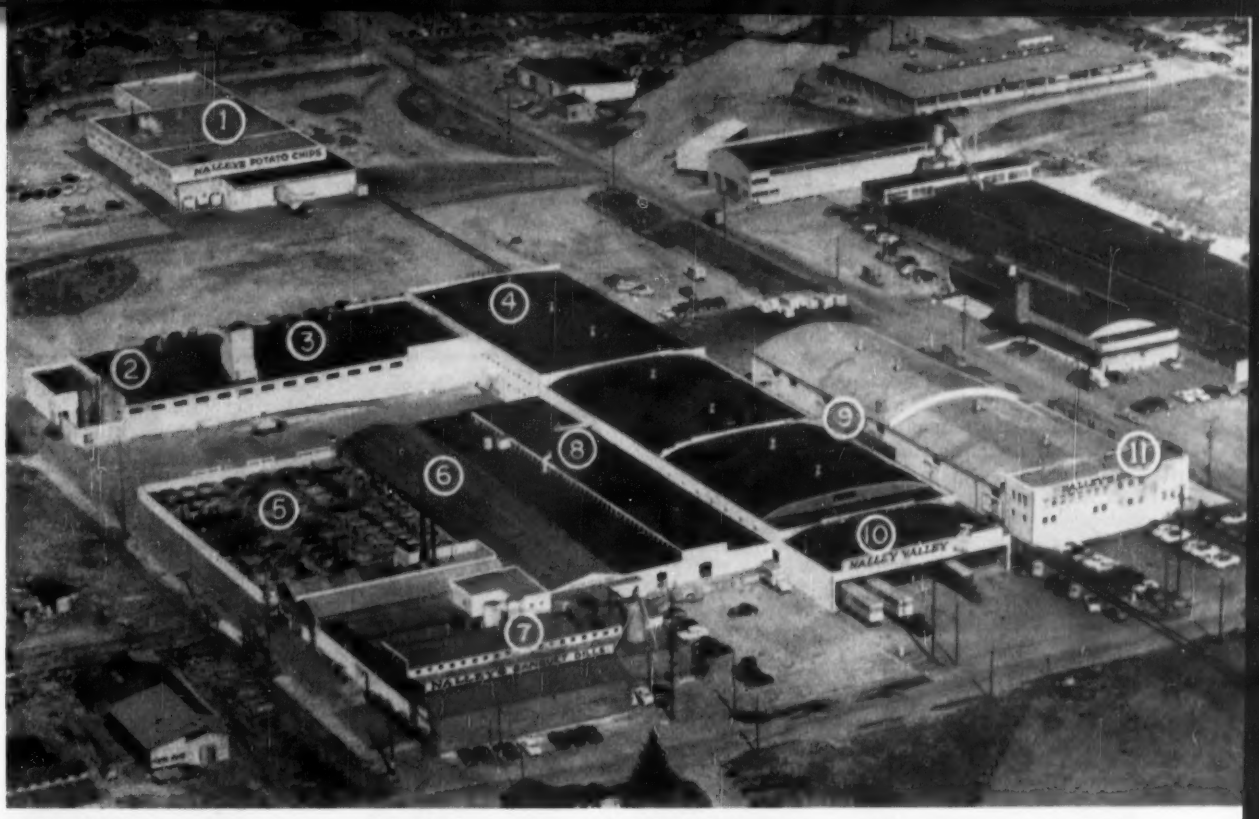
Basis of the method is selective bacterial breakdown, or fermentation, by use of suitable cultures. Strains have been developed for the various wastes, including some that break down plastic materials.

First step in the operation, developed by the Biochemical Research Institute, Threefold Farm, Spring Valley, N. Y., is grinding the refuse when necessary. This has been done successfully with a large reducing mill, such as the Red Band Hog (Mitts & Merrill). Hammer mills, due to their tendency to clog, are not recommended.

Ground material is then conveyed under sprays of starter solution containing a suspension of soil bacteria or their spores—approximately 1 oz. of dry starter per ton of refuse. Nitrogen level should be 1-3%, maintained, when necessary, by addition of calcium nitrate or urea.

Time required to break down the material varies from 16 days in summer to 24 days in winter. Good aeration and ample inoculation prevent risk of spontaneous combustion. Fermentation must be carried to completion before residue is plowed under, otherwise the breakdown will remove nitrogen from the soil, resulting in a deficiency of this element.

Greatest problem posed in the case of many food plants is transportation to composting plant—approximately 3 acres are required to handle a daily output of 20 tons of waste. Finished compost finds a ready market due to its many advantages as an organic fertilizer.



NEW FACILITY, just finished last year, brought manufacture of Nalley's food products and company's general offices together on same plot in Tacoma, Wash. Shown are: Potato chip plant (1); syrup and mayonnaise raw products storage (2), processing (3), finished storage (4); tank storage (5); pickle storing and curing (6), processing (7); canning (8); warehouses (9); truck loading docks (10); general offices (11).

PATTERN FOR PROCESSING

In Multi-Item Operation

Single-story buildings, straight-line operations, complete palletization effect large savings in materials handling costs, enable closer control in the production of 47 different food products on five processing lines

GLENN DANIELSON and JAMES VALENTINE
Food Technologists, Nalley's, Inc., Tacoma, Wash.

EARLY in 1954, our company finished, in Tacoma, a 14-yr. expansion program that most efficiently teamed parent-executive and plant operations.

As a result, production costs have been reduced by saving on raw-and-finished materials handling, and by providing means for closer supervision over all operations.

To obtain maximum economy and production, our manufacturing processes were carefully adapted to single-story buildings and U-shape packaging lines.

Palletizing is utilized almost completely in handling containers and finished goods. Manufacture, from raw material to finished product, proceeds in an efficient straight line. Bulk raw materials are fed to unit operations at any desired speed, and under ideal sanitary conditions.

Cased, finished goods are palletized and loaded on trains of 6-8 carts. These are drawn by small tractors to storage warehouses, where loaded pallets are stacked four high by lift-trucks. From storage, they are handled by lift-trucks, inside a large covered shipping dock for truck shipments, or through doors to the rail-spur dock for car shipments.

Plant operations begin with the receiving of raws. A great variety of these are constantly moving to storage or directly to processes. So handling of only the major products will be described.

Five Major Process Lines Employed

Although our company produces 47 food items, operations are performed by the following five major lines: Syrup, mayonnaise, potato chips, canning, and pickling.

Raw materials for syrup and mayonnaise production are received at the warehouse adjoining their manufacturing areas. Located here are pumps, refrigerating equipment, and a bulk filling station for salad oil.

Under the pump room floor are three 17,000 gal. salad oil storage tanks. Two kinds of oil are received in tank cars and unloaded by gravity through a permanent pipe system.

SALIENT IN THE SUCCESS

—of any food plant is efficiency of its processing operations.

For unless processing is properly controlled, variations in quality and uniformity of finished products result, adversely affecting the entire enterprise.

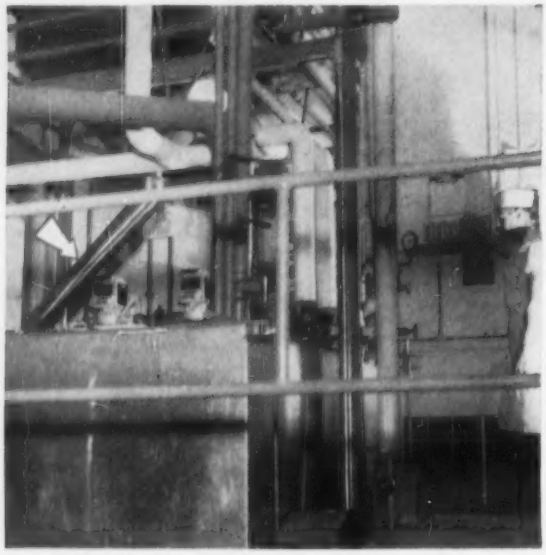
Also, profits are specifically influenced by efficiencies, or lack of them, in processing.

Thus, food processors may well observe the model operations at the Tacoma, Wash., plant of Nalley's, Inc.—pioneer company which has seven subsidiaries in the Pacific Northwest and Canada and which makes 47 different food products.—The Editors

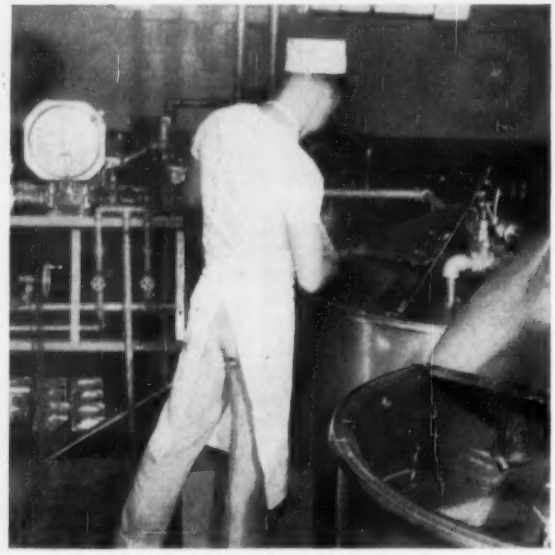
Being underground, these tanks conserve space and, also, take advantage of the natural refrigeration provided by an average ground temperature of 50-55 deg. F. In addition, the uniform temperature prevents excessive moisture condensation on interior walls of tanks.

Tanks are heavily tarred to resist corrosion and equipped with steam heating coils. Their interiors are covered with

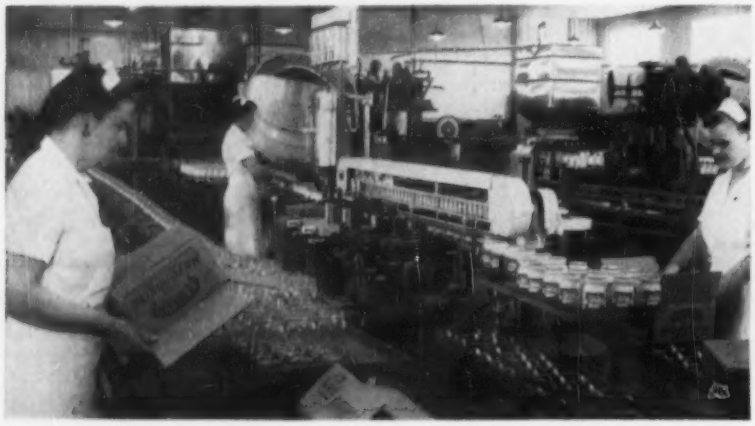
Syrup, Mayonnaise, Salad Dressing Preparation



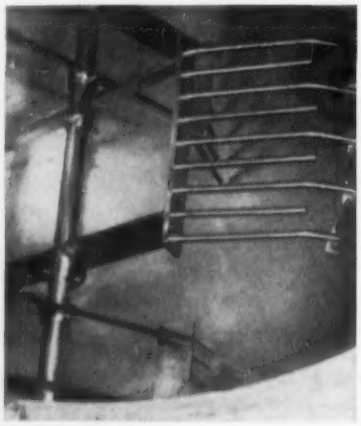
IN making syrup, granulated sugar from overhead bulk hopper is chuted through swivel-spout (arrow) to cooker. Hot water and corn syrup feed through meters (rear). Entire operation is pushbutton controlled.



FOR mayonnaise and salad dressing, oil, vinegar, and water are metered into premix tanks. Egg yolk, spices, are weighed in. Switches, valves, speed controls are within easy reach of operator.



MAYONNAISE filling, casing line is U-shaped for efficient operation. Large hoppers over fillers even out production surges.



FORK-TYPE agitators produce emulsion in premix tanks.

5 coats of plastic paint to prevent rusting and eliminate possibility of contaminating the oil with iron.

On demand, by remote control at the premix stations, oil is pumped through an automatically controlled heat exchanger then through an overhead pipe system to process point. When the valve is closed at a premix station, oil returns through pressure relief valves and separate lines to storage tanks. Oils may be recirculated from tanks through the heat exchanger to maintain desired temperatures. These handling systems were engineered to provide efficient, safe operation from raw material receiving points to finished products.

Liquid Sweeteners by Tank Car

Three corn syrup and liquid sweetener tanks are located above ground. Their interiors are covered with two coats of plastic. Sterilamps, mounted inside and at the top of each tank, prevent mold formation on the product.

Temperature of corn syrup is automatically maintained at 110 deg. F. for easy pumping by circulating 175 deg. F. water through coils in the tanks. Additional heating is supplied by five-5,000w. electric immersion heaters located in pipe manifold of hot water system. These are automatically cut-in at nights and week-ends when the central boiler is not operating.

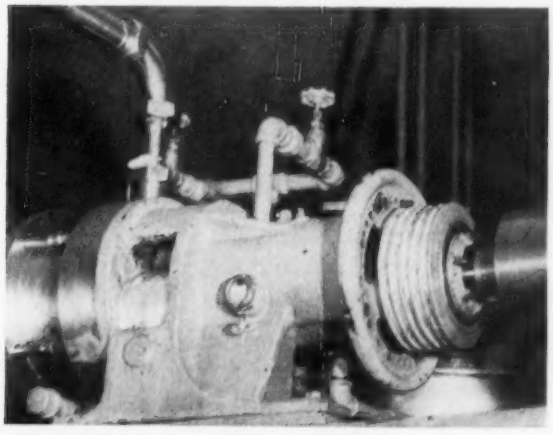
A 4-in. unloading pump moves syrup from tank cars to storage by means of a permanent pipe system and 6-in. rubber hose. Pipe system is traced by a steam line, and insulated with a heavy overwrap. Steam also heats coils in rail cars to reduce the syrup's viscosity.

Three pumps deliver liquid sweeteners to processing points. Two of these serve a single, overhead pipe system. They may both draw simultaneously from a tank, or each pump from separate tanks. The third moves liquid sweetener to syrup cookers. The system may also be used for pumping predetermined quantities of liquid sugar and corn syrup through a single discharge line.

All syrup lines are wrapped with lead cables and insulated. As a safety measure, several thermostats are attached to these lines to control product temperature.

Granulated Sugar, Too

Currently bulk granulated is being used, since it has a price advantage over the liquid product. System for handling it was designed for flexibility, speed under sanitary conditions, and minimized labor.



COLLOID MILL subjects mayonnaise and dressing to shearing action that disperses oil globules.

The bulk storage tank has a cone-shaped bottom, 1-ft. above floor level. At the apex a butterfly valve discharges to an 8-in. pipe leading to boot of a bucket elevator. This unit, in turn, discharges to another 8-in. pipe entering top of storage tank.

A 15-ft. screw conveyor, leading from the outside truck-dump hoppers, also connects with this boot. Trucks are also unloaded pneumatically through a 6-in. pipe that connects with top of storage tank. Another 6-in. pipe recirculates sugar dust back through the unloading system.

Sugar moving into the tank from both pipes is caught in a hopper from which chutes discharge to scale hoppers at processing points. When gate valves in these chutes are closed, sugar merely overflows into the storage tank.

A solenoid switch on automatic scales at processing points throttles delivery of the final 30 lb. of sugar. A second solenoid automatically shuts-off the dribble-valve when desired weight is attained.

YOU'LL FIND a graphic 4-page Foldout Flowsheet of Nalley's advanced multi-product processing operation on pages 118-121.

Egg yolks, received in refrigerated rail cars in 30 lb. tins, are palletized and moved to zero storage by lift trucks.

Two 1,000-gal. stainless vinegar storage tanks are mounted on the ceiling of the starch room with stainless pipes running to stations in mixing department. Vinegar is pumped to these tanks through 900 ft. of plastic hose from storage tanks located in the pickle plant. Several tees lead off this line to supply requirements of the pickle operation.

Syrup, Mayonnaise Lines

For efficient materials handling, syrup and mayonnaise processing is carried out between raw material storage and finished product warehouse. The three areas are separated by cement-block walls. Two entry ways, equipped with coiled steel doors, provide fire protection.

Manufacturing space is entirely clear, with no supporting posts, and is radiant heated by coils embedded in the concrete floor. Floor and a 5-ft. wainscoating are of acid-proof brick tile.

Encircled by a raised steel platform, from which all valves and controls are within easy reach of the operator, the syrup processing unit is a model of efficiency. Its square-shape effects considerable savings in floor area.

Lumberjack brand syrup is made in four 300-gal. insulated square tanks, with aluminum sheeting over the insulation for protection and sanitation. Each cooker has two agitators mounted on a single shaft, and steam coils to provide ample heating capacity. Discharge valves are operated from the control platform.

From an overhead stainless scale-hopper (2,000-lb. capacity) sugar may be chuted to any cooker. All operating and recording instruments (on back wall) are visible and available to the operator. Syrup line outlets are equipped with foot valves that close upon finish of delivery.

Formulation of a batch starts with metering hot water and corn syrup into a cooker. Steam valve to coils is opened and, when ingredient level is sufficiently high, agitator is started and bulk sugar from the hopper is added. When temperature of syrup reaches 215 deg. F. steam is shut off. After about 3 min. to allow escape of air, a solids check is made with a hydrometer. Then, following adjustment of sugar solids when necessary, maple flavor may be added and batch pumped to a reservoir tank. A fine-mesh screen, mounted in the cookers' discharge line, removes foreign particles.

A pipe system served by two pumps, discharges finished

Potato Chip Manufacture

SMALL and large bags, cartons are filled with automatically weighed quantities of chips. Bags are then double folded, heat sealed, stapled.

syrup to an elevated stainless tank. Gravity lines from this tank feed four filling machines.

Syrup Filling

There are two automatic lines for syrup packaging: One is U-shaped for 12 and 24-oz. bottles; the other is oval—for 48-oz. decanters and 5 and 10-lb. tins. Syrup is filled at 190-200 deg. F., so a glass preheater (hot water) is used to eliminate breakage hazard.

Empty bottles are unscrambled, then conveyed to the filler in a straight line, raised to make contact with rubber seal rings on filler spouts, and lowered after filling. They are immediately sealed by a rotary capper, washed, cased, and cases palletized.

The 48-oz. decanters and 5 and 10-lb. tins are filled on a pressure feed type unit with 6 spouts, and automatically capped, then washed and cased.

Filling head is in two sections—main and tapered fill—with each operating during 90 deg. of its revolution. Sections are fed by two pumps through separate heat resistant hoses.

Filler has a front panel with a tachometer (indicating cans per min.), variable speed controls, and pump speed indicators.

Making Salad Dressing

Initial salad dressing step is formulation of a 3,000 lb. batch of starch slurry in a mixing tank, equipped with a side entering agitator and pump for product recirculation or delivery to the supply tank.

Starches are added to a measured amount of tempered water and, under agitation, a suspension is quickly obtained. Sugar, vinegar, and salt are then added, along with additional water to finish the batch of slurry, which is pumped to a supply tank. All equipment used in this process is stainless steel.

From the supply tank, slurry is continuously pumped through two Votators, where it is heated from 90 to 197 deg. F., then cooled to 90 deg. F, in 10-14 sec. and pumped to one of six holding tanks. First tubes of these heat exchangers are steam jacketed, the second are water jacketed. Temperatures are regulated by automatic recorder-controller instruments.

To the starch paste are added weighed quantities of egg yolks, spices and flavorings. Then the agitator is started, and salad oil is metered in to form the emulsion. Mixing starch paste with egg yolk serves to dilute and disperse the yolk uniformly, thus aiding in building the emulsion. Finally, additional starch paste is pumped in to bring the batch to a calibrated level.

While one batch is being made, contents of an adjoining tank are pumped through a colloid mill and to the filling machine hopper, thus providing a continuous flow of finished product.

With clearances of 0.020-0.060 in. (rotor speed 3,600 rpm.), the colloid mill subjects products to terrific shearing action, homogenizing and dispersing oil globules throughout the emulsion.

Mayonnaise, Sandwich Spreads

Because of the concentrated emulsion in mayonnaise, premixing procedure is important. Egg yolk and spice are thoroughly mixed with a portion of a previous batch in a premix tank. Then a measured amount of water is put in and oil addition begun. To obtain a good premix emulsion and a quality finished product, the oil temperature is maintained at 55 deg. F.

Finally, vinegar is added and the batch mixed at high speed, then finished in the colloid mill.

Items such as sandwich spreads, tartar sauce, Thousand Island dressing are made with a salad dressing or mayonnaise base, but with variation in spicing. Tartar sauce is a pasteurized blend of dill pickles, onions, and parsley, blended with mayonnaise. Sandwich spread consists of sweet pickle relish and a salad dressing base.

Three types of French dressings are prepared in the premix tanks. One, a non-segregating type, utilizes the colloid mill. The others by-pass the mill and are pumped directly to the reservoir supplying the filling line.

There are two automatic quart and pint jar lines for mayonnaise and Tang* salad dressings. Semi-automatic line packages 8 oz. jars of mayonnaise, sandwich spreads, and related items. A fourth line, with two types of filling machines, is used for French dressings in 8 oz. bottles.

These fillers are also used for gallon glass jars and No. 10 tins. Can line is located between the two. Before filling, bottles are cleaned by a combination blower vacuum-cleaner mounted on the piston type filler.

Leaving filler, screw caps are applied to jars by a rotary capper, then they move on to a straight line labeler.

To fit requirements of this single floor plant, extra large hoppers were built for the fillers, and other unit operations were placed on elevated platforms for efficient product handling.

Organisms usually affecting salad dressings are yeasts. And optimum growth conditions are near the pH range of these products.

To prevent contamination a sanitation crew cleans all processing equipment, packaging lines, and the floor in the manufacturing area at end of each production shift. Another purpose served by frequent cleaning is to minimize corrosion of stainless steel.

Potato Chips, Other Packaged Items

A separate building houses the potato chip plant in which processing, packaging, potato storage, and tempering departments are divided off by cement block walls. In addition to chips, this department produces 3 other prod-

* Trade-marked.

ucts and packages 50 candy varieties that are purchased in bulk.

Only two ingredients other than potatoes are used in the manufacture of potato chips—salt and vegetable oil.

Temperature of the 10,000 sack (100-lb.) warehouse is maintained at 50 deg. F., and relative humidity of 85-90% during winter storage. Heat is supplied from hot water coils cast in the concrete floor.

An automatic ventilating system maintains uniform temperature and humidity in the room. To allow sufficient ventilation, improved heat transfer, and economical space use by stacking, potatoes are stored in wooden pallet-crates.

In the manufacture of chips, potatoes from storage are dumped manually into a hopper, then elevated to an abrasive peeler. Following inspection and trimming, a bucket elevator carries them into the slicer. Usual slice thickness is .050 in., but the lot or potato variety may require slight changes in thickness for optimum quality. Next, a washer removes excess starch, then product is dewatered in a reel and drops into fryer.

New Type Fryer Ups Plant Output

A fryer utilizing a new oil heating principle has recently been installed in this department. It complements production of a conventional type fryer.

In the new unit, oil is continuously circulated from the fryer through an efficient heat exchanger and back to the fryer. The conventional unit has a firebox under it.

One of the first fryers to provide increased cooking capacity, this new kettle handles up to 650-800 lb. hr. of finished product, compared to the usual 500 lb. Another advantage is its accurate and automatic oil temperature controls. Oil becomes extremely heat sensitive and its quality adversely affected at temperatures above 425 deg. F (its "smoke" or burning point). Temperatures cannot be as accurately controlled or rapidly changed in a unit having a firebox directly under the kettle, as in this new one with the heat exchanger principle.

A pump draws oil continuously from a sump, located at the product exit end of the kettle, and circulates it at the rate of 300 gpm. through the heat exchanger. Two sets of screens filter oil at the sump. Operation of paddles and belt in the fryer, and of the potato slicer, are quickly and easily regulated and controlled, at a central panel. Here, also, oil temperature is controlled.

The enclosed heat exchanger is comprised of a set of continuous coils in a firebox. Two thermometer bulbs are mounted at the exit end of the coils and connected to two automatic temperature controllers. One is set at 370 deg. F., the other at 380 and, in this temperature range, oil is provided to the kettle.

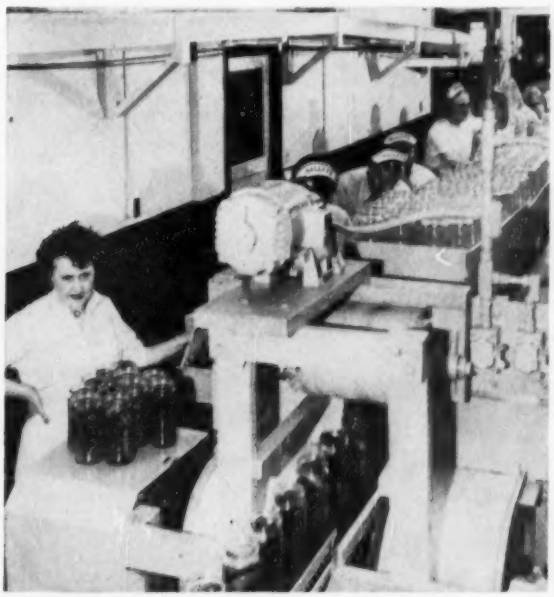
The controllers automatically actuate a motor-unit regulating the valves that feed a bank of five oil burners. If frying oil temperature should rise above 380 deg. F., fuel oil feed is automatically cut-off by a solenoid valve.

Two additional safety units are included in the automatic controls. A heat sensitive fuse located above the burners near an open port in the firebox actuates the solenoid valve if temperatures rise to a dangerous level. And should cooking oil pressure drop to a precarious level (normal pressure, 35 psi.), a switch actuates the valve.

Chip Operation Detailed

Hot oil is pumped into the entry end of the kettle from the heat exchanger. Baffles prevent excessive turbulence. Potato slices first move forward on the oil current, aided by revolving paddles mounted above the oil surface. A wire-mesh belt, which holds the chips submerged in the oil, moves them through the second half of the fryer. Oil temperature in the fryer is reduced, by the incoming potato slices, from 375 deg. F. to an average of about 350. The 5-in. oil level in this cooker is critical. It is manually regulated as needed.

Putting Up Fresh-Pack and Salt-Stock Pickles



BANQUET DILLS are hand-packed in glass jars at 22-station table. Then jars are check-weighed, filled with vinegar-salt-flavor liquor, topped to proper headspace, vacuum-sealed, coded, and pasteurized.

SALT STOCK cucumbers for use in relish making are packed in large wooden tanks in mid-July. Three months or more later they are transferred to 1,000-lb. palletized bins and moved to processing.

Chips drop from the fryer onto a draining belt, then onto an inspection belt. They are salted, as they spill over the apron of the second belt, then elevated (15 ft.) to another belt which moves them to the three weighing machines.

Paddles, on short belts, sweep chips off this belt into chutes equipped with vibrators that feed the weighing machines. Receiving units of these machines are actually scale-platforms. When the pre-set weight is reached, movement of the scale-platform actuates electric controls of the delivery mechanism. A blast of compressed air removes product from the scale-platform of the machine used for small bags, the other two deliver chips through a trip opening in the platform.

All units deliver chips to plastic funnel-spouts, attached to a wheel synchronized with the discharge operation of the scales. Operators fix bags to discharge ends of these spouts. After filling, bags are automatically removed, drop onto a V-shaped conveyor leading to four bag-sealers. These units double-fold the bags, apply heat, staple the fold in two places, then drop bags on a transverse conveyor leading to the casing station.

Pickle Processes

The pickle operations are best described when fresh-pack and cured-pack pickles are treated separately.

The former is prepared from fresh cucumbers, only a few hours from vine to jar, whose keeping quality depends on pasteurization. Cured-pack is prepared from cucumbers fermented in salt brine, then repacked during the winter months.

After each day's picking, fresh cucumbers, in 80 lb. sacks, are collected at shipping stations and trucked to the plant for grading and processing. They are either salted or processed into fresh-pack items within 24 hr.

Major grading operation is carried out as fresh cucumbers are received. With cured stock, grading is kept to a minimum to reduce handling cost. After weighing, sacks are emptied in a pit, from which cucumbers are conveyed into a rod-reel grader to be rough graded and washed.

A 5 hp. motor turns the rod-reel at 3 rpm. This grader is divided into three sections of varying rod spacing. In the 1st section they are $\frac{3}{4}$ in. apart, in 2nd $1\frac{3}{8}$ in., and in 3rd $1\frac{7}{8}$ in. A flanged screw that makes $2\frac{1}{4}$ turns inside length of grader, moves the product through.

Small "whole sweet" size cucumbers drop from 1st section, medium size from 2nd, and large "slicers" from 3rd. Those from the second section are conveyed to a rotating, diverging rod-type grader for more accurate size-separation. Cucumbers passing through the grader are rejected because of their large size.

A perforated $\frac{3}{4}$ in. pipe, mounted in the center of the cylinder, spray-washes product as it is graded.

Chute that feeds cucumbers into the rod-and-reel grader serves a double function of transporting and dry cleaning. It is made of $\frac{1}{2}$ in. dia. iron bars 4-ft. long, spaced $\frac{1}{4}$ in. apart, arranged parallel to one another and curved to form a trough, which is inclined at 45 deg. Conveyor belt from dumping pit drops cucumbers into this trough and any foreign material falls through the bar interstices.

From graders, cucumbers move by rubber conveyor belts to 500-lb. capacity slatted, wooden dump-boxes. These are fitted with a bottom pallet so lift trucks can transport them to the salting area or packing lines for immediate processing.

Cucumbers for "Banquet dills" are handled with particular care. Following size grading they are washed by a rotary brush unit then fall into vats of 30 deg. salometer brine to soak for 1-hr. After soaking, they are hand-packed in 24-oz. jars at a 22 station packing table. A series of conveyor belts considerably increases efficiency of packing.

Glass jars are conveyed the full length of the packing table on an upper belt, at a height easily reached by packers. Cucumbers are transported on two, table-height rubber belts, from which packers keep their individual bins filled.

Filled jars are placed on a small center belt, then check-weighed and filled with a liquor, prepared from vinegar, salt, and flavoring by a trickle-briner. They are then "topped" to proper headspace, sealed on a vapor-vacuum unit, code dated, and conveyed to the pasteurizer.

This unit is a converted hot-water beer pasteurizer. Center section is operated at 180 deg. F; time of the pasteurizing cycle is 30 min. Then jars are cooled to 120-130

Cannery Designed for Versatility

VEGETABLES are peeled on abrasive units seen through wall openings (rear), then drop on wide belt that moves them past inspectors who complete peeling operation and place vegetables on top conveyor. From here they are conveyed to high-speed slicing machines, cut into $\frac{3}{4}$ in. chunks.

MEAT for beef stew, and chili con carne is cooked in these two steam-pressure braziers, then inspected and weighed.

deg. F., air dried, labeled, cased, and palletized for storage.

Sweet Cucumber Chips

This line is an example of efficient packaging of a sliced, fresh-pack pickle item. Fresh cucumbers of small slicer-size from the No. 2 grader are washed in a brush-washer, then conveyed to the slicer. This high speed unit (3,000 lb./hr. capacity) cuts cucumbers into ¼-in. slices that drop into a "squirrel cage", which mechanically removes most ends and broken pieces. Slices pass onto an inspection belt, thence into a vat of 30 deg. salometer brine.

After ½ hr. soaking period, sliced fresh onions are mixed with the cucumber slices, and the mixture is dipped into a conveyor that feeds the hand-pack filler.

Glass jars, from an unscrambler, are conveyed single file under a salter (converted to dispense whole spice). Then they are filled with cucumber and onion mixture and check-weighed. Conveyed to a volume filler, they are filled with hot, spiced, sweet liquor, topped to proper headspace, sealed, and conveyed to the pasteurizer.

This is a walking-beam exhaust box maintained at 180-190 deg. F. by a temperature-controller-recorder. Pasteurizing, tempering, and cooling cycle requires 45 min. at the rate of 70 jars per min.

Cooled to 120 deg. F, dried with an air jet, and labeled, the finished product is then cased, palletized, and stored by lift-truck.

Mid-July receipts are usually insufficient to keep the fresh-pack lines in operation, so these cucumbers are salted in 230 wooden 2,000-3,000 gal. tanks. Average annual 8,000,000 lb. cucumber receipts is evenly divided into salt stock and fresh-pack items.

Clean, graded cucumbers are dumped into a clean tank partially filled with 30 deg. salometer brine. The filled tank is "keyed down" with a wooden slat cover, and additional brine is added (more salt, if needed) to cover the cucumbers.

Following the period of active fermentation, the salometer brine is increased to 40-50 deg. to keep it from freezing in winter. Quality control in the curing operation includes checks on salt, pH, and total acid. Also there is a microscopic examination of the fermenting brine.

Cured salt stock is the raw material employed for sweet relish, hamburger and mustard relish, whole sweet pickles, cut sweets, processed whole dills, and sliced dills. It is not used for at least three months after salting.

This stock is prepared for further processing by soaking in warm water (120-130 deg. F.) to remove the salt and "plump" the stock. Tanks are agitated with steam during this freshening operation. Alum and tumeric are added to the last processing water, and the stock is then ready for conversion into various cured pickle items.

Relish Preparation

Salt stock and cured cabbage or cauliflower, chopped by cutter, form the base of relishes. These move by a short conveyor to a steel draining table, where excess moisture is removed. Then sugar, spice, and vinegar are added and the mix is heated in jacketed mixing kettles to pasteurizing temperature (170 deg. F). Preparation time for each 60-gal. batch is approximately 15 min. Finished hot relish is pumped through sanitary glass tubing to a 12 oz. jar filler. Jars are filled at the rate of 100 a min., then sealed on a steam flow sealer, washed, air dried, labeled, and cased.

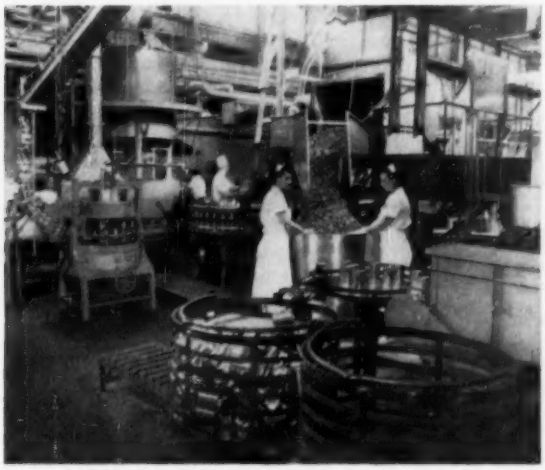
Processing 8,000,000 lb. of cucumbers requires a surprising volume of raw materials other than cucumbers. For example: 1,501,668 lb. of sugar, 1,288,000 lb. of salt, and 179,872 gal. of vinegar were needed in the 1953-1954 season. In the same period $50,000.00 worth of 24 different spices or spice oils were used.

Bulk sugar is delivered to the production line by a hopper traveling on a monorail. Vinegar is stored in four 8,000-gal. tanks and two 3,600-gal. tanks. It is transported to the production lines by either rubber or plastic hose. Salt is handled in 100-lb. bags and moved by forklift trucks.

Canning Meat and Specialty Items

Flexibility of the cannery operation is quite significant. Here nine kinds of meat and specialty items in four different can sizes are processed and packed without a major change-over. With a few conversions, four different pickle

Makes Nine Meat Specialty Items



BEEF STEW is prepared in tilting mixer (top right), chuted to hand filler. Sterilized cans receive measured quantity of gravy from filler (left), are conveyed to hand filler, then sealed and discharged to retort basket.

BASKETS are picked up by an electric hoist and moved on monorail to retorts. Processing temperature here is controlled by automatic instruments. Final steps are cooling, drying, labeling, casing.

How Nalley's QC Operates

Quality control is performed directly in the various Nalley plants, as well as in the centralized laboratory. Two food technologists and three assistants are employed in developmental and control work and to maintain and supervise all product formulas. A number of the company's products and processes were developed here.

The QC largely is concerned with measuring and regulating physical, chemical, and bacteriological factors that affect a product. This starts when raw materials enter the plant and continues through their conversion into finished products, and until they are sold and consumed.

Some factors considered in evaluating raw materials and finished products are: Color, flavor, impurities, crispness, age, net weight, drained weight, acid, salt, sugar content, and total soldis. Pickle production QC is concerned with: Sanitation of product and equipment; acid, sugar, and salt content: temperature of cover liquor; temperature of pasteurizer; container headspace; vacuum; center temperature of product being pasteurized; time of pasteurization; and time and temperature of cooling.

All finished pickle products are sampled, incubated to check keeping quality, and their measurable qualities compared to a standard for product uniformity.

Cannery products QC primarily covers checking raw materials; maintenance of sanitary packing conditions and procedures; control of proper blanching times and temperatures; cooking and cooling of products; checking proportions of ingredients; consistency; net weight per tin; headspace; vacuum; and proper yield per batch.

Two sample tins of each product from each retort load are incubated at 100 deg. F. for two weeks by the resident Bureau of Animal Industries inspector. This inspector's concern with sanitation, quality of raw materials, and keeping quality of the finished product is a valuable aid in maintaining quality control in the cannery.

items are being packed on the same equipment at the plant.

Items are: Beef stew, chili con carne, pork and beans, spaghetti and meat, spaghetti sauce, noodles and beef, spaghetti and cheese, rice dinner, chili beans in chili gravy, cross-sliced Banquet dills, cross-sliced cucumber chips, tins of Banquet dills, whole dills.

One especially versatile piece of equipment in these preparation lines is a modified hot water blancher used for spaghetti, noodles, navy beans, and chili beans. These four products are blanched in a similar manner, and capability of the unit is best described by the soaking-blanching operation for beans used for pork and beans.

California small white beans are first washed on a riffle washer, then hydro-conveyed through an overhead 4-in. line to the stainless steel soaking-tank. Here, 115 sacks (110 lb.) are soaked overnight in tepid water (80 deg. F.) which is drained off in the morning. Beans are then cooled and kept moist during the day's operations.

Tank is located directly above the blancher and is connected with a perforated chute in which most of the residual cooling water is drained from the beans as they are chuted from tank to blancher.

The perforated drum, inside the blancher, is fitted with a spiral that moves beans through 200 deg. F. water to the delivery end, where they are again cooled with a light water spray.

Blancher can be adjusted to operate for periods of 3-18 min. at any temperature up to 212 deg. F. Its outside shell has been modified by addition of side cleanout doors above the water line. Their locations correspond to those of the cleanout doors in the inside drum. For cleaning, the doors in drum and shell are aligned.

Bulk can handling equipment has proved to be very efficient for this operation. Cans are received in box cars and unloaded on a siding 200 ft. distant, then conveyed by an overhead system to the cannery. Midway along the conveyor are four storage bins, with capacity of one car load, to act as a reserve in case shipments are not on schedule. Cans pass through an overhead can sterilizer, then roll by gravity to the 6-pocket filler.

The cannery production line derives a considerable amount of its flexibility from its adjustable tin conveyor system. Conveyors can be adjusted in a few minutes to the proper width for 8¾-oz., 15-oz., 30-oz., and No. 10 tins. Two hand-pack pocket-fillers are arranged in tandem on the line for use on items, such as beans for chili and pork and beans. Beef stew and spaghetti and meat can be packed on the regular hand-pack filler.

Two model 00-6 steam flow units set in parallel seam 15-oz. cans. One of these can be converted for 8¾-oz. cans, and a third one is used for 30-oz. cans. The No. 10 tins are closed on a fourth (00-8) unit, to which a permanent conveyor system is installed. After seaming, all cans are washed, processed in retorts, labeled, and sealed by the same equipment.

Beef Stew Is Outstanding

Probably the most widely known of Nalley's canned meat products—beef stew—is packed in 15 and 30-oz. cans. Its basic ingredients (beef, potatoes, carrots, and onions) are raw or fresh products that create additional problems.

Fresh, boned, whole carcass beef, in 100-lb. boxes, is moved directly from a 35-deg.-F. cold storage room to the grinder. Frozen beef is partially thawed, then cut into chunks with a guillotine before grinding.

Meat is ground through a 1¾ in. plate into 100-lb. stainless steel pans. After weighing, it is braised, then emptied onto a stainless steel sorting table. Here, two operators remove any gristle which may have been missed in the boning operation. The sorted, braised meat is again weighed before combining it with the stew mix.

Vegetables are peeled by two abrasive units, then conveyed to two tables, where women inspect and finish peeling them. Larger vegetables are halved here.

To resemble "home style" stew, vegetables are cut into chunks ¾ in. thick by two high-sped slicing machines. Frozen peas are added according to formula. Then vegetable mix and meat are poured into a skip-hoist and elevated to a sausage mixer for blending. Mixture is then chuted to the hand pack filler.

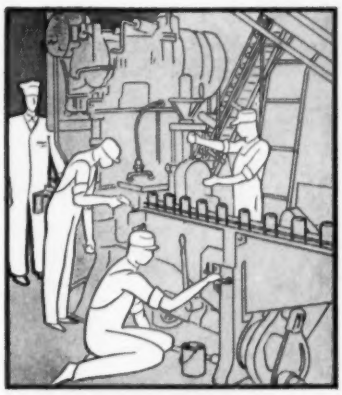
Stew gravy is prepared by dry-mixing spices with flour, making a paste by adding cold water, then diluting the paste to the proper batch volume and adding tomato sauce. It is precooked to 180-190 deg. F. in two 200-gal. stainless steam-jacketed kettles, then pumped to a holding kettle, from which it flows by gravity to the filler.

The 15-oz. cans are filled, one-third full, with hot gravy at the rate of 110 per min. They move by conveyor to the hand-pack filler, and two operators fill them to proper headspace with meat and vegetable mixture. Filled cans then move into two separate head-spacers and thence to steam-flow can-seaming units.

Sealed tins are first washed in a spray washer, then are dropped, jumble-pack, into retort baskets having a capacity of 450 cans. Baskets are picked up by an electric hoist and moved by monorail to a retort for processing.

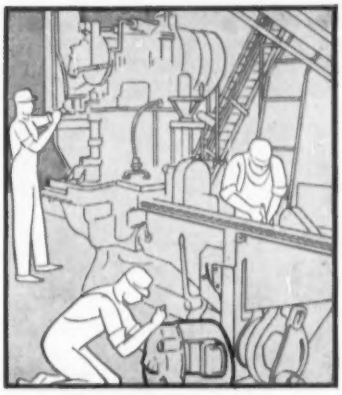
Temperatures of these retorts are controlled by automatic instruments. Each basket is tagged with a Cook-Chex card to insure proper processing.

Following retorting, cans are cooled, air dried, dumped on an unscrambler, labeled, then cased. An electronic can-ejector discards any unlabeled ones, and these are rerouted through the machine.



Operational

Double-Action Maintenance and Sanitation



Post-Seasonal

BRUNO PILORZ

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By circumstances, canning plant maintenance is divided into two types —*operational* and *post-seasonal*.

Objectives of the latter are usually long range and more fundamental. Here the aim is to prolong useful life of equipment and buildings.

This type of maintenance is usually preventive. When the season for processing any particular product begins, all equipment used for its preparation and processing must be in such shape that breakdowns during the season are unlikely.

Although employees are idle when equipment failures stop the operation of production lines, nevertheless they must be paid during the downtime.

Mother nature is non-cooperative. With a breakdown during height of the harvest, it may often be necessary to process the accumulated raw products in overtime, thus adding labor costs at a higher rate to the labor costs already met but without production) during downtime. In cases of more serious breakdowns even the loss of raw product may occur.

Extent of overhaul for any year during the off-season period should depend on the date of the last complete overhaul and on the severity and hours of service given the equipment during the preceding season, plus the observations of its performance during the past season.

If a seamer, completely overhauled only a year ago, has in the preceding season closed only a relatively small number of cans, then only a checkup is indicated.

If, however, a very large number of cans have passed through it since the last complete overhaul—particularly if the product is of a corrosive nature—then the machine should be taken down and any bearings, gears, or other parts, if found worn, should be replaced.

Keep a Record

A two-part record should be kept on every piece of major equipment. This should show last complete overhaul, whether done in the plant or outside, and service data on the equipment in operation (that is, number of cans seamed each season since date of overhaul, plus performance observations of seamer mechanic). This information will serve as guide to off-season overhaul requirements.

Double seamers are chosen here as an example because successful operation of a canning plant depends so much on accurate performance of this equipment. With modern seamers operating at 600 cans per minute, product losses of considerable magnitude may occur if a seamer is not in reliable shape and thus produces faulty work.

Similarly a record can be established for the maintenance of major preparation machines, such as pitters and peelers.

Extent of off-season overhaul, necessary for continuous cookers and coolers and exhaust boxes, depends not only on length and severity of service since last complete overhaul, but also on progress of corrosive wear, which is inevitable in that type of equipment and which again depends a great deal on quality of water used in the plant.

Power Trucks, Too

When overhaul of vitally important maintenance equipment is considered, it is necessary to include power lift trucks. Since in most cases this unit plays an important part in material handling, it must always be kept in good operating order. Plagued by frequent downtimes, especially when needed most, a truck is costly to keep in service.

It must be remembered that a power lift truck frequently replaces from three to ten men working by hand. An inexpensive but efficient method of determining when overhaul of the power lift truck becomes necessary is to install, at very low cost on each truck, an hourmeter to constantly report on truck efficiency.

It should be clear that records of factual data serve best for scheduling and budgeting off-season maintenance of major equipment. Such records should comprise date of last complete overhaul, severity and length of service since that date, observations of performance made during preceding season by operating personnel, and their recommendations.

It is, of course, true that good maintenance costs money, and total dollars expended on plant maintenance in a modern plant is, therefore, bound to be higher than an old, manually-operated plant. But maintenance cost per unit of finished product is not necessarily higher than it used to be—because mechanization has, in most cases, resulted in a large increase in plant capacity.

Further, it's obvious that without mechanization the operating cost of a food plant would have become so high as to make the owner noncompetitive.

On the other hand, in these very competitive days it's essential that maintenance be closely watched in order to keep costs down. Proper organization of maintenance work becomes, therefore, an important function of plant management.

Good scheduling of maintenance jobs is a necessity, so that crews can move from job to job without lost motion. Preparation must be made for each job in order to assure an ade-

(*Turn to page 154*)

THREE mechanically-refrigerated compartments—for milk, for ice cream, and for dairy items—are integrated in this compact retail-route milk company truck. Easy access marks design.

They've Gone "All Out" On

Delivery-Truck Refrigeration

Meyer's new tri-compartment retail unit separately accommodates milk, ice cream, and products . . . Vehicle completes dairy's special retail-wholesale fleet featuring four refrigerated models that clinch quality, garner new economies

A MECHANICALLY-REFRIGERATED retail milk-route truck containing two separate additional compartments for ice cream and dairy products now has rounded out the completely refrigerated fleet operated by Meyer Sanitary Milk Co., Kansas City, Kan.

Supplier to both the retail and wholesale trade, the company began its refrigeration project by first giving careful consideration to both weather aspects and competitive factors. Then it followed up with a thorough one-year study of operations with the new all-refrigerated fleet.

It found that in the complete redesigning and refrigeration of the trucks it had won much more than merely the means of averting deterioration or spoilage. General quality of the various items was decidedly up. They were being delivered to customers in optimum condition. Also, there were new economies in delivery costs.

Comprising the fleet are: (1) wholesale milk-route trucks, (2) wholesale ice cream route trucks, (3) combination wholesale ice cream-milk route trucks, and (4) the recently acquired combination retail ice cream-milk route trucks.

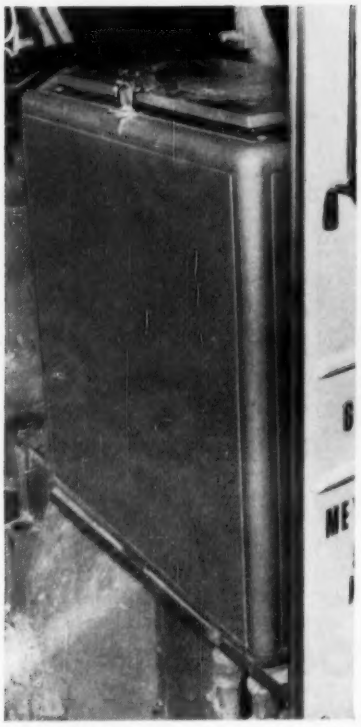
All trucks, retail and wholesale, are refrigerated exclusively by ammonia from the plant system, with make-and-break couplings (Dole). The retail trucks have two thermostatic expansion valves.

It was found necessary to provide thermostats (Ranco) and solenoid cut-off valve to assure positive shut-off for the milk compartment so that the common plant ammonia line can continue to pump on the ice cream box employed. Every cold line is insulated. Drip pans originally installed under the overhead milk compartment plates were removed because they interfered with convection currents.

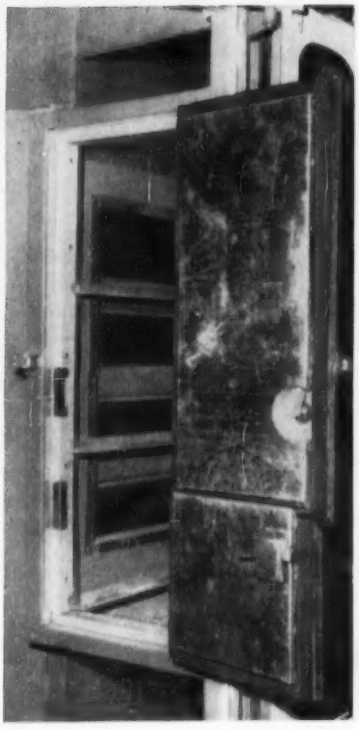
Down to Details

The retail units are step-in Divcos with cold-cabinet body inserts (also from Divco). These inserts are available as original factory equipment or may be obtained through the maker's service department for installation by the customer on Models 31, 33, 34, and 37 (9,000 lb. gross vehicle weight).

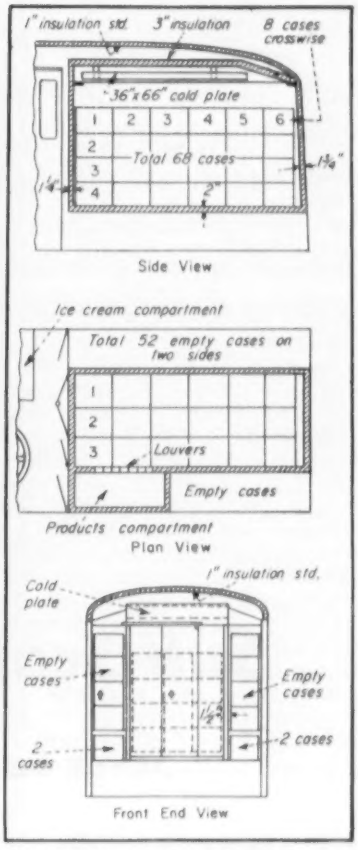
These trucks have three separate compartments for sustaining desired storage temperatures for milk, ice cream, and dairy products, with addi-



ICE CREAM box. Holding 13½ gal., it's refrigerated to —50.



DAIRY ITEMS compartment. Note doors and shelves. It's kept at 40 F.



LOCATION of cold cabinet and compartments, case capacities, insulation.

tional space for empty cases. Thus, four-way versatility is achieved.

For products such as eggs, butter, etc., there is an insulated compartment (36 in. high by 30 in. deep by 12 in. wide) built in former empty-case storage space on the driver's side. Access is by Dutch door.

Here, refrigeration is simply contrived by cutting louvers in the wall section where this compartment joins the main cold cabinet, which will be described in a moment. In this manner, the cabinet maintains temperature of this compartment at a suitable product-storing temperature of 40 deg. F.

Then there is the ice cream compartment. It is constructed of an insulated box with flat-hinged top door and four cold plates for inside walls. This unit is located on a shelf to the right of the driver and directly below the right windshield. Its capacity is 13½ gal. of ice cream, and inside temperature is kept at —50 F.

Now for the main cold compartment—the insert for storing milk. This consists of an insulated cabinet (with cold plate along its top). It is installed along the length and center of the truck, leaving a space on either side.

These two spaces serve a double function: First, they separate the cabinet wall from the body of the truck, thereby preventing transfer of atmospheric heat from body to cabinet. Second, they rack 48 empty cases (24 on each side) for return to the plant.

Cabinet interior holds 68 standard cases (15 in. by 12¼ in. by 10 in.) arranged four high, three wide in the first five rows and four high, two wide (placed crosswise) in the sixth row.

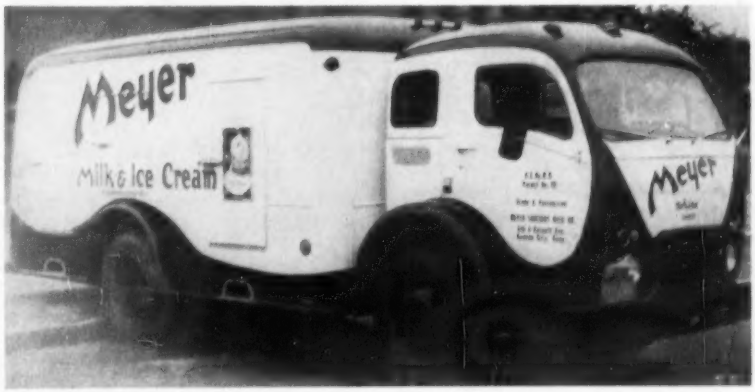
Insulation of the cabinet consists of Fiberglas (roof 3 in., floor 2 in., sidewalls 1½ in., front doors 1¼ in., and rear doors 1¾ in.). The cabinet roof extends to within 3 in. of the truck roof. Latter has 1 in. of insulation.

Refrigeration is supplied to the cabinet by an 18 deg. F. ammonia-type cold plate (Dole). Measuring 33 in. by 66 in. by 2⅜ in. it maintains a product temperature of 35 F. within the cabinet.

Easy Access

As for the cab, two front jack-knife type cabinet doors and a hinged door open into the driver's cross aisle, thus providing complete access to the load without crowding the driver. And

(Turn to page 211)



COMBINATION wholesale truck (White type) has separate compartments for milk and ice cream. Side-door steps are only 19 in. above ground.

New process cuts costs, saves labor, and is in tune with modern merchandising . . . Investments detailed . . . Economic scale of operation, length of season determined

3 WOMEN now handle job that formerly required 30 on this picking line of plant that has adopted sub-scalding. Move eliminated additional line.

Sub-Scald Poultry Processing

Saves Labor, Improves Product Appeal

J. C. ABBOTT
Department of Agricultural Economics,
University of California, Davis

Outstanding feature of the new sub-scald poultry-processing technique is its coupling of merchandising advantage with economy in processing costs.

Very pertinent in these times of rising wage rates is the fact that dressing and evisceration labor costs are cut substantially—by sub-scalding birds at temperatures not previously thought practicable (138-140 F.)—and by producing finished, ready-to-cook poultry in the same plant.

True, the new method leads to packaging and freezing expense not incurred with New York dressed birds, and so the labor savings are reduced.

But because of improved product quality and packaging, the market for the product is decidedly broadened.

Sub-Scalding Benefits

There are three commercial poultry processing methods: (1) Semi-scald New York dressing (scalding in water at temperatures up to 130 deg. F.) with evisceration in the retail store; (2) semi-scald dressing with evisceration in the plant; and (3) sub-scald dressing with evisceration in the same plant. We will consider these processes and evaluate the economic significance of the trend to sub-scalding.

The processor considering the question of whether to sub-scald or not, may weigh five significant points:

NEW VS. OLD. Sub-scalded eviscerated turkey (left) is sealed in a plastic wrap shrunk to fit. Typical New York dressed bird is seen right.

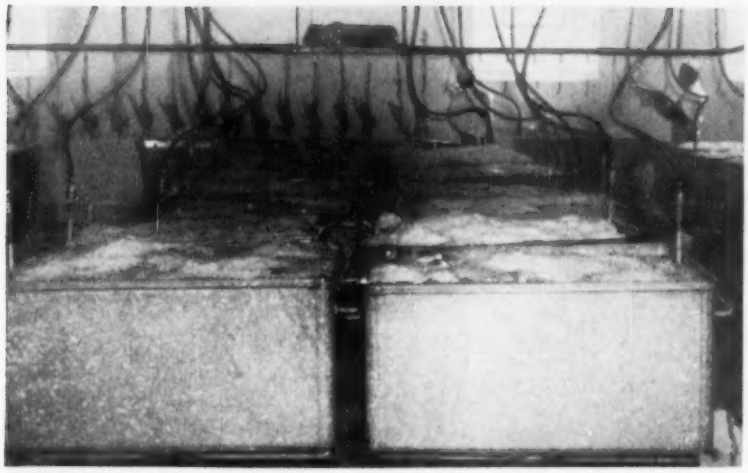
1. *Saving in labor costs is striking.* Elimination of expensive and tedious hand picking and finishing lines saves up to 2c. a pound.

2. *Sub-scalded birds have greater consumer appeal.* Processing needed to maintain a uniformly white, unblemished under skin is in line with modern packaging techniques and self-service merchandising.

3. *Competitive position is improved.* By reducing labor costs, the processor is in a better competitive position with lower wage areas and those closer to major markets.

4. *Younger birds can be processed.* Whereas conventional scalding requires excessive pin feathering to obtain the clean finish that prevents down-grading of the product, the sub-scalded birds are free of pin feathers. Furthermore, this new procedure now enables poultry growers to market younger birds.

5. *Change of emphasis in the breeding of poultry may result.* Poultry geneticists need no longer concern themselves to the same extent with the development of chickens and turkeys with light colored pin feathers, which the consumer would not notice. Easy removal of such disfigurements by sub-scald processing enables breeders to give greater attention to other improvements.



ICE-SLUSH chilling tanks replace old cool-room. Each tank holds 50 birds. Compressed air pumped through water provides agitation, increases chilling.

But before adopting a new technological procedure that requires plant conversion, or for a proposed plant, the processor needs data on: (1) Prospective savings in cost; (2) investment involved in a sub-scald evisceration plant; (3) most suitable scale of operation; and (4) length of season for most economical poultry operation.

These factors were examined in an economic evaluation of 16 California turkey processing plants in 1953.

Some of the plants in which detailed labor allocations were noted confined their operations to either sub-scald or semi-scald techniques, while others had recent experience with both processing methods.

Labor Saved

Critical difference between semi-scald and sub-scald evisceration plants was found to lie in the picking labor requirements (Fig. 1.) Semi-scald plants require large hand picking crews and additional pinners, together with long conveyor chains and more space to accommodate them.

An efficient disposition of labor in each plant is set out (Table I) for semi-scald and sub-scald turkey processing, respectively. Labor allocations reflect work positions which should be filled if the plant is to operate with reasonable smoothness. Men and women are specified in accordance with contemporary practice.

The difference is striking. Whereas Plant C requires 154 workers for semi-scald operation, with sub-scald methods a crew of 90 is adequate. Number of workers employed picking and removing pin feathers and checking this work is reduced by 85%. A picking line forewoman is no longer needed, and the overall labor crew amounts to less than 60% of that formerly re-

Closeup of Process Factors

Use of hot water to loosen feathers for easier removal from poultry replaced dry picking in commercial dressing operations many years ago. However, semi-scalding (scalding in water at temperatures up to 130 deg. F.) still left considerable hand work after birds had passed through the mechanical pickers.

In many plants, clean picking has involved an additional manual manipulation of each bird against a buffing drum. All plants have employed crews of pickers to take off feathers still adhering to the carcass.

Pin feathers, too, have presented an additional processing problem. Numerous "pinners" have been employed to remove these by hand to produce a product acceptable to consumers and one that would not be down-graded.

Scalding at higher temperature (160-180 F.) makes mechanical picking simple. But it results in skin damage marring the bird's appearance. Suffering likewise is the bird's keeping qualities. Advantage of using intermediate temperatures around 138-140 F.—now termed sub-scalding—is that the bulk of supplementary hand picking and finishing labor is eliminated.* And this method produces a product that is free of pin feathers and of good quality.

Heretofore, sub-scalding has not been adopted generally because processors feared that the product would not sell. In this process, the cuticle or outer layer of skin is completely removed. And on exposure to air, the underlying skin darkens quickly and turns brown. Directly following sub-scalding the bird is white, but this color may be retained only so long as the carcass is protected from dehydration by an enveloping film of moisture or when packaged in a moisture-vapor proof wrap.

The trend toward sub-scalding received its greatest impetus when reasonably priced, durable, transparent wraps became available. These shrink to fit the carcass and withstand the passage of moisture vapor. Quick freezing finishes the process, enclosing the product in a neat, bright finish having strong consumer appeal.

Virtual prerequisite to sub-scald evisceration is guaranteed access to freezing facilities. Whereas, New York dressed birds can be held in 34-deg. F. cool rooms, evisceration exposes a wide area of internal body tissue to invasion by bacteria.

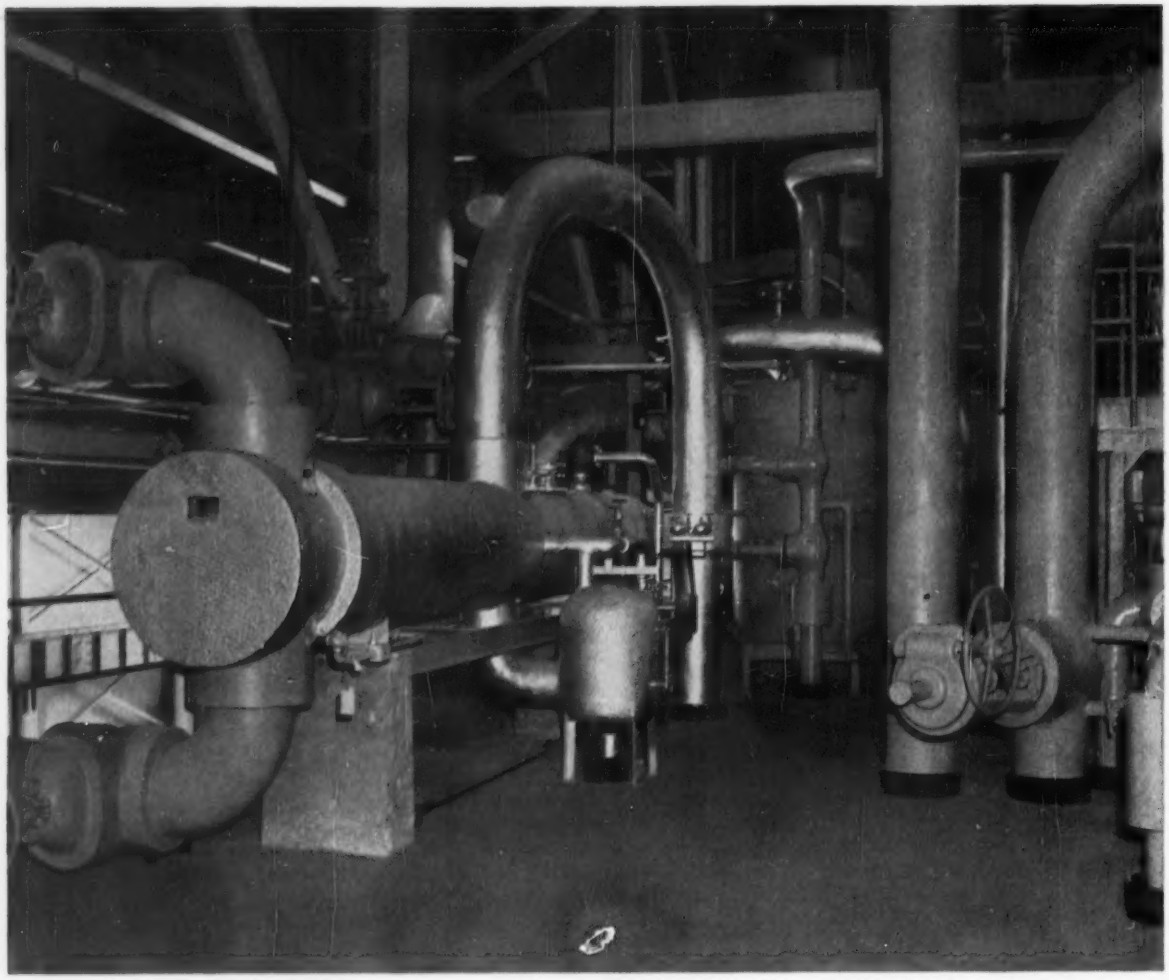
Starting from the picking operation and continuing through the marketing sequence the product must be kept under close control, enveloped in its moisture-proof film, and the duration of exposure must be reduced to a minimum.

METHODS COMPARED

This new technique utilizes mist sprays along conveyor lines to keep the bird's surface moist. Ice-slush chilling, immediately following evisceration, replaces the 34 F. cool room, and sealing each bird in the vacuumized plastic bag follows immediately after chilling. Quick freezing then minimizes risks of deterioration during storage and marketing periods. In contrast, New York dressing does not protect from dehydration, and wrapping the New York dressed carcass with a plastic cover is impracticable because head and feet remain attached. In plants where evisceration is added to conventional dressing operations additional plant facilities, equipment, labor and capital expenditure will be required.

Moreover, higher standards of sanitation are needed since inner surfaces of the carcass are exposed to repeated handling and contact with different pieces of equipment. The structural and sanitary standards for such plants, under the USDA. Inspection Code, are notably higher than those customary in dressing plants. In addition, a separate eviscerating room is necessary, with ceilings and walls constructed with an impermeable washable finish.—J. C. A.

*M. F. Pool, F. P. Mecchi, Hans Lineweaver, and A. A. Klose, *Effect of Scalding Temperature on Processing and Initial Appearance of Turkeys;* paper presented at annual meeting of Poultry Science Assn., Vancouver, B. C., Aug. 1953.



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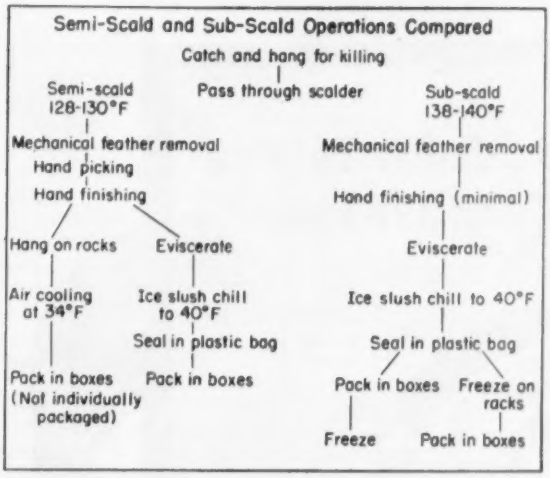

FIG. 1. **FLOWSHEET** comparison of conventional with sub-scald turkey processing. Note reduced hand labor.

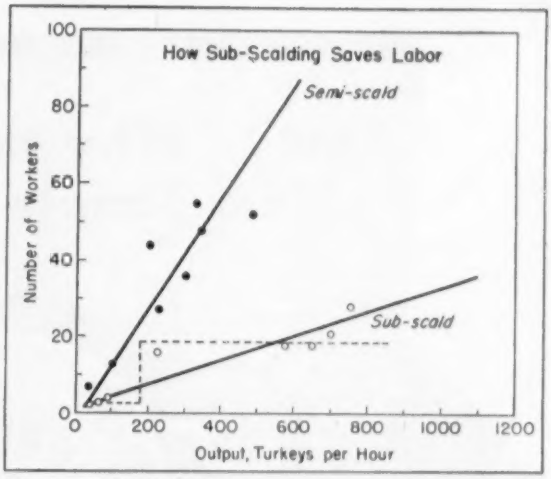

FIG. 2. **REGRESSION** lines demonstrate how sub-scalding permits same rate of production with fewer workers.

quired. Table II summarizes the cost difference between semi-scald and sub-scald dressing for each major processing item in each of the different plants.

In assessing labor costs, the rate applied to each type of worker is based on the union hourly schedule, customary piece rates, and such social security and compensation insurance expenses as are borne by the employer. Saving on labor costs totals some 20c. per turkey in each plant.

Comparable data on sub-scald and semi-scald dressing operations are plotted according to the number of workers (male and female) required at normal capacity (Fig. 2). Regression lines fitted mathematically to each group indicate the average relationship between labor requirements and dressing capacity for each technique. The formula used is:

Sub-scald dressing:

$$X = 0.03276\ Y + 1.181\ \sigma_{xy} = 2.2916$$

Semi-scald dressing:

$$X = 0.14556\ Y - 1.264\ \sigma_{xy} = 5.8479$$

Where X equals number of workers, Y equals output of turkeys per hour, and σ_{xy} is standard error of estimate, a measure of the variation from the trend line which can be expected with certain levels of probability.

In semi-scald plants with large picking and finishing crews, it was necessary to increase the number of workers virtually in proportion to the number of turkeys handled per hour. In plants where this method of dressing is used, the economy of increasing production output is small.

In contrast, the sub-scald plants achieved marked labor economies. Plant groups operating at rates of 550-750 birds an hour employed approxi-

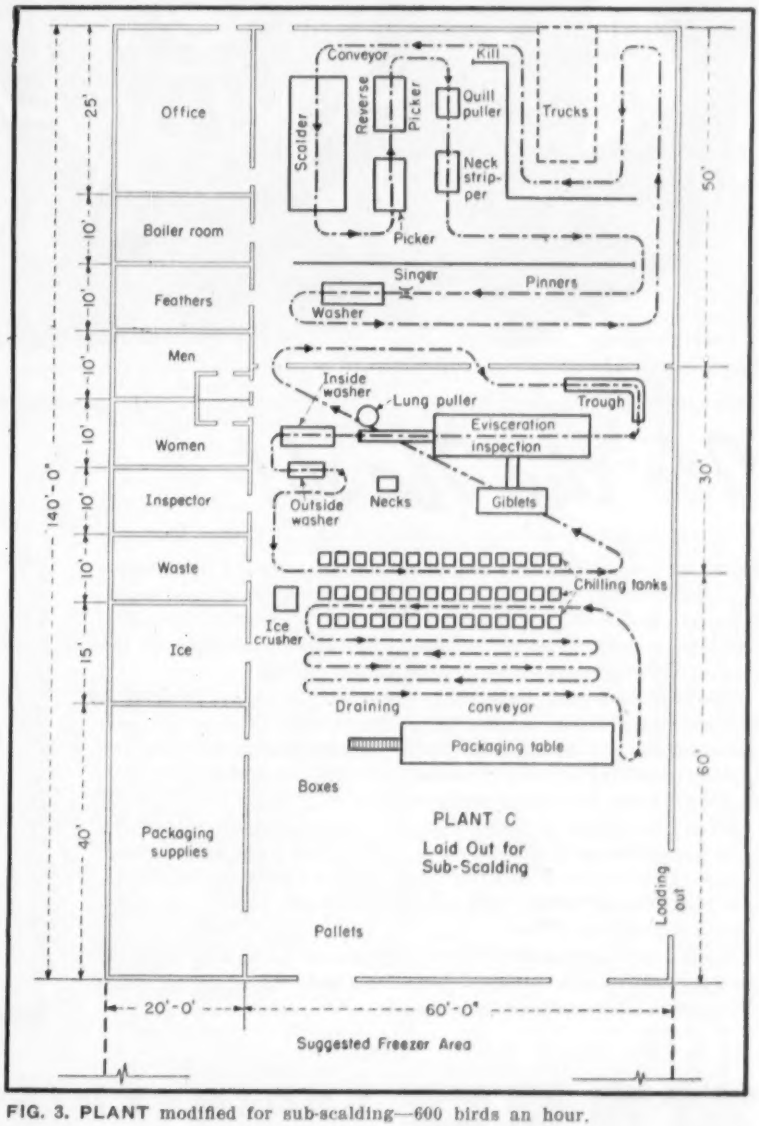

FIG. 3. **PLANT** modified for sub-scalding—600 birds an hour.

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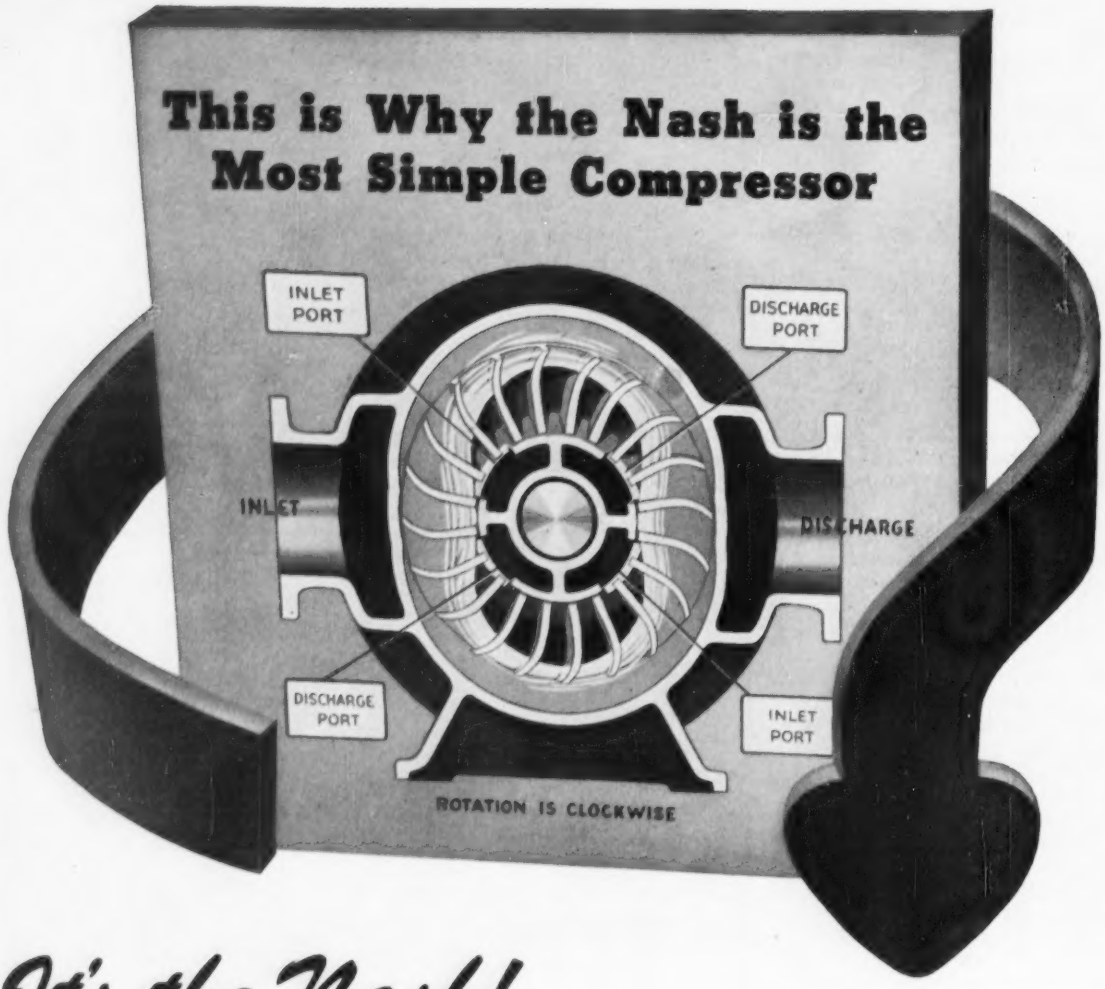

It's the Nash!

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75 pounds in a single stage.

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mately 20 workers each on dressing, whereas semi-scald plants half this size needed more than twice as many.

The board tendency, based primarily on two distinct groups of large and very small plants, is that a tenfold increase in production output will require six or seven times the amount of labor. A realistic appraisal of this relationship suggests a step function beginning at the point where each additional conveyor line is introduced.

Investment Compared

Since confining a comparative cost study to either a single plant or mixed groups might gloss over differential effects of scale and output, this analysis represents a composite of four different types of plant.

The following size categories are representative of the field in terms of production capacity.

(A) 60 turkeys per hour: Farm processors and small retailers with no mechanized conveyor system

(B) 300 turkeys per hour: The smaller commercial plants handling turkeys on a conveyor system

(C) 600 turkeys per hour: Plants employing the most intensive application of equipment to labor on a single conveyor line

(D) 1,200 turkeys per hour: Plants employing two such conveyor lines in parallel.

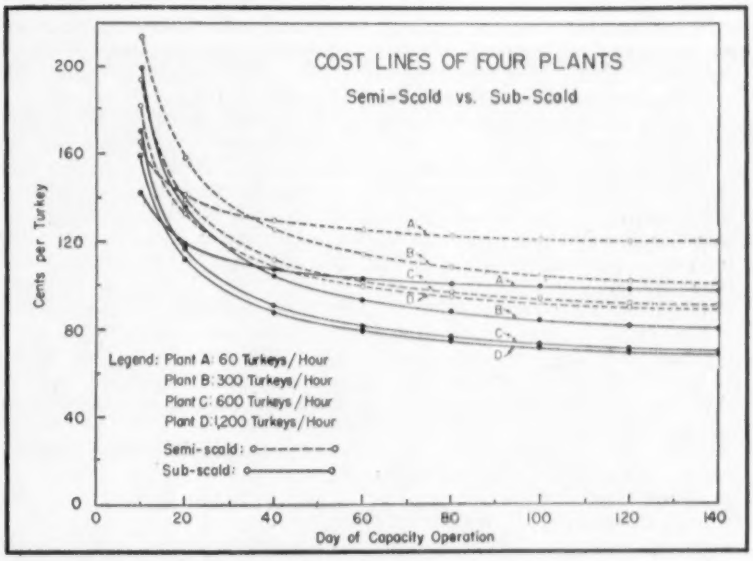

FIG. 4. CURVES show how total processing costs of different-size plants vary with length of season.

A layout for a plant handling 600 turkeys per hour, modified in accordance with sub-scald practice, was designed to allow for prospective changes in procedure (Fig. 3). It conforms to general principles of plant production flow advocated by construction engineers and poultry processing machinery manufacturers.

Plant and equipment overhead costs were based on new replacement values and standardized annual rates for interest, depreciation, and other fixed charges.

Two major factors govern the cost of poultry processing plant buildings under today's conditions: Conformity to USDA sanitary inspection stand-

TABLE I—HOW AND WHERE Sub-scalding Saves Labor

Plant	A		B		C		D	
Turkeys per hour	60		300		600		1,200	
	Sub-scald	Semi-scald	Sub-scald	Semi-scald	Sub-scald	Semi-scald	Sub-scald	Semi-scald
Dress:								
Catch and hang	1m*	1m	2m	2m	2m	2m	4m	4m
Kill			1m	1m	1m	1m	2m	2m
Scald	½m	½m						
Pick	1½m	1½m8w*	2m	2m31w	2m	2m62w	4m	4m124w
Clean and finish		1w	1m4w	1m	1m7w	1m	2m14w	2m
Take off line			1m	1m	1m	1m	2m	2m
Cut legs and rehang	10w		2m	2m	2m	2m	4m	4m
Check pin feathers		10w	1w	5w	2w	10w	4w	20w
Eviscerate			4m14w	4m14w	4m25w	4m25w	8m50w	8m50w
Service chilling tanks	1m	1m	3m	3m	5m	5m	10m	10m
Package	(2m8w)**	(2m8w)**	8m10w	8m10w	13m20w	13m20w	26m40w	26m40w
Cleaning, maintenance	(2w)**	(2w)**	3m	3m	4m	4m	8m	8m
Forewomen			1w	2w	1w	2w	2w	4w
Total	14	23	57	89	90	154	180	308

* Sex of workers denoted by m for men, w for women.

** Positions occupied by same crew workers in second part of their shift. In smallest plants, eviscerated birds accumulate in chilling tanks. When first birds have been cooled adequately, whole crew switches to packaging. First phase takes approximately 2½ hr., second 1½ hr.

TABLE II—COMPARING Sub-scald And Semi-scald Evisceration Costs

Plant	Labor	Utilities	Ice	Packaging Materials	Miscellaneous	Overhead*	Total
	Cents Per Turkey						
A. Semi-scald	63.70	0.54	13.50	35.23	0.60	15.82	129.39
Sub-scald	41.77	0.52	13.50	35.23	0.60	15.39	107.01
Difference	21.93	0.22	.....	.....	.....	0.43	22.38
B. Semi-scald	53.38	0.94	5.40	27.55	1.43	21.63	110.33
Sub-scald	33.56	0.93	5.40	27.55	1.43	20.75	89.62
Difference	19.82	0.01	.....	.....	.....	0.88	20.71
C. Semi-scald	46.77	0.66	4.50	27.10	1.07	10.91	91.01
Sub-scald	27.01	0.64	4.50	27.10	1.07	10.52	70.84
Difference	19.76	0.02	.....	.....	.....	0.39	20.17
D. Semi-scald	46.77	0.61	4.50	26.95	0.71	9.80	89.34
Sub-scald	27.01	0.59	4.50	26.95	0.71	9.50	69.26
Difference	19.76	0.02	.....	.....	.....	0.30	20.08
	Difference as Percentage of Semi-scald Cost						
A	34.43	3.70	.....	.....	.....	2.72	17.30
B	37.13	1.06	.....	.....	.....	4.07	18.77
C	42.25	3.03	.....	.....	.....	3.57	22.16
D	42.25	3.28	.....	.....	.....	3.06	22.48

* Unit overhead cost based on operating seasons, as follows: A, 30 days; B, 60 days; C and D, 100 days.

TABLE III—ESTIMATED Plant And Equipment Investment

Plant	Hourly Capacity Turkeys	Floor Capacity Sq. Ft.	Investment (Dollars) Plant*	Equipment	Total	Total Fixed Investment per Hourly Capacity Dollars Per Turkey
Sub-Scald Evisceration						
A	60	1,250	8,275	4,150	12,425	207
B	300	7,200	47,700	50,020	97,720	326
C	600	11,200	72,650	72,596	145,246	242
D	1,200	21,000	130,025	141,252	271,277	226
Semi-Scald Evisceration						
A	60	1,370	8,875	4,150	13,025	217
B	300	8,400	55,200	50,670	105,870	353
C	600	12,800	85,350	73,376	158,726	264
D	1,200	24,000	148,325	142,812	291,137	243

* Including purchase of site.

TABLE IV—ITEMIZED Sub-scald Processing Costs

Plant	A	B	C	D
Turkeys per hour	60	300	600	1,200
	Percent			
Labor	39.03	37.45	38.13	39.00
Power, light	0.23	0.70	0.55	0.55
Heat	0.21	0.23	0.24	0.19
Water	0.05	0.10	0.11	0.11
Ice	12.62	6.03	6.35	6.50
Packaging materials	32.92	30.74	38.26	38.91
Overhead	14.38	23.15	14.85	13.72
Miscellaneous	0.56	1.60	1.51	1.02
	100.00	100.00	100.00	100.00

ards, and the nature of the materials employed. In practice these two factors are closely related. Full adherence to the requirements of the sanitary code limits the selection of materials used in construction.

Conformity with the federal inspection code requires that "ceilings and walls in rooms and compartments where exposed edible products are processed, handled, or stored, shall have tiled, enameled, or other smooth surface impervious to moisture."[4]

Single floor buildings are the most convenient. Walls 12-ft. high provide adequate headroom for ventilation and the installation of conveyor machinery. Sloping concrete floors fitted with covered gutters and outside drains are required. Access at truck loading height facilitates transfer of product and supplies by truck or rail car. And detailed electrical, water, and steam lines are necessary to serve the equipment.

Total cost of constructing plants to such specifications in various materials was computed according to estimating methods recommended by two building contractors and checked by an independent engineer.[5] A combination steel frame, metal sheet, and concrete building offered the best value at 1953 prices.

Estimated construction costs (Table III) are lower for sub-scald than semi-scalded eviscerating operations of the same capacity because less space is taken by lengthy picking lines. New York dressing plants with no evisceration space would cost 75-80% less than these sub-scald investments. Construction and materials used for inside walls and ceilings account for most of this difference.

Manufacturers' distributors quoted prices on equipment selected in appropriate balance for the size of plant and the technique employed, with allowances for freight, installation, and other charges. Total outlay for the modal plants (Table III) reflects the degree of technical divisibility in the equipment. Most pieces are made only in a limited number of sizes, and smaller designs usually cost proportionately more than the larger models. Over the whole range of plants there is little difference between sub-scald and semi-scald equipment outlay.

Depreciation was charged on the plants at 2½% and on equipment at rates ranging from 10-25% according to its apparent vulnerability to obsolescence. Three percent of the original investment, equivalent to 5-6% on the undepreciated balance, was charged as interest, 0.6% for insurance, 1.0% for local property taxes and, for repairs, 2% on buildings and 3% on equipment.[6]

Converting to sub-scald lightened estimated total processing plant and equipment-overhead; for Plant A: 2.7%, B: 4.8%, C: 6.2%, and D. 5.2%.

No critical basis for differentiation in administrative costs between the two methods could be derived from the plants studied. Observed administrative staff overheads reflected the character of the business rather than the processing technique employed. Administrative duties may be simplified by elimination of large picking crews from sub-scald plants.

On the other hand, close control over each processing phase, including quick freezeing, is mandatory if the sub-scald product is to maintain an attractive appearance.

Scale of Operation

Another important aspect of this comparison is the differential benefit accruing to the larger as against the smaller plants from a changeover to sub-scald. Sub-scalding reduces processing costs 17.30 and 18.77% in the smaller Plants A and B. In plants handling 600 and 1,200 birds per hour the reduction exceeds 22%.

In practice, the smaller plants maintain a competitive position primarily because they are able to hire workers at lower effective rates than the larger fully unionized concerns. General adoption of sub-scalding and the consequent sharp cut in labor requirements will eliminate their main protective advantage.

Another disadvantage of small plants is that their ice and packaging materials expenses are higher because they buy in small lots. Part of the high supply price for plastic wraps reflects the cost of color printing (brand names) on the film. They also incur much heavier unit overhead costs. Building space, equipment, and administrative outlay do not increase proportionately with the capacity of plant.

Critical economic differences in scale of plant lie between A and B, and between B and C. Predominantly manually operated concerns fall behind the smallest type employing an automatic conveyor because of their low ratio of machinery to labor and the high supply prices paid for necessary materials. In part compensation are lower utility and overhead costs.

Difference between B and C represents the effect of under-utilization of an automatic conveyor system and full utilization. Much of the equipment and labor needed in conjunction with a 300-turkeys-per-hour system could handle 600 per hour just as efficiently. Plants operating on scale D achieved their high output capacity by duplicating the type C conveyor system. Approximately the same cost relationships are maintained whether semi-scalding or sub-scalding is used.

Outstanding feature of the various cost items is the share of total costs absorbed by packaging materials (Table IV). In plants with high labor economics, purchases of these materials are actually more significant in their cost structure than wages. Furthermore, an additional 10% of direct costs may be attributed to labor on packing.

Longer Seasons, Lower Costs

Specialized turkey plants are only operated for part of the year. Traditionally, the turkey season consisted of a few intensive weeks before Thanksgiving and Christmas, when young turkeys were most in demand, and a period in early summer when breeders sold off old birds which had served their reproductive purpose. Under these conditions most turkeys were sold fresh.

Wider use of freezing and a broadening of the seasonal market through sales of turkeys in parts and to restaurants and institutional caterers have extended the potential period of operation to four or five months.

Variation in season length has an effect on total processing costs in sub-scald and semi-scald evisceration plants (Fig. 4). The crucial factor is the weight of overhead costs in relation to direct items. The higher the ratio the more advantage is gained by operation over a longer season. In all plants the ratio of direct to overhead costs is lower under sub-scald procedures than semi-scald. Under the semi-scald system picking and finishing costs remained the same heavy burden in all plants no matter how much the season could be extended.

In general, plant, equipment, and administrative overheads were a strong influence up to the 60th day of capacity operation. Extension of the season from 60 to 100 days would cut the costs of plant A 3.1% of B 9.1%, of C 9.1% and of D 8.4%, The rate of gain in cost reduction between seasons of 60 and 100 days duration is small compared with that obtaining up to 60 days, but may well be significant for profits in a sharply competitive environment.

Trend to Sub-Scald

The pace of adaptation to sub-scald procedures has been limited by two main factors: Inability of existing plant structures to meet evisceration sanitary requirements, and the feeling

(Turn to page 212)

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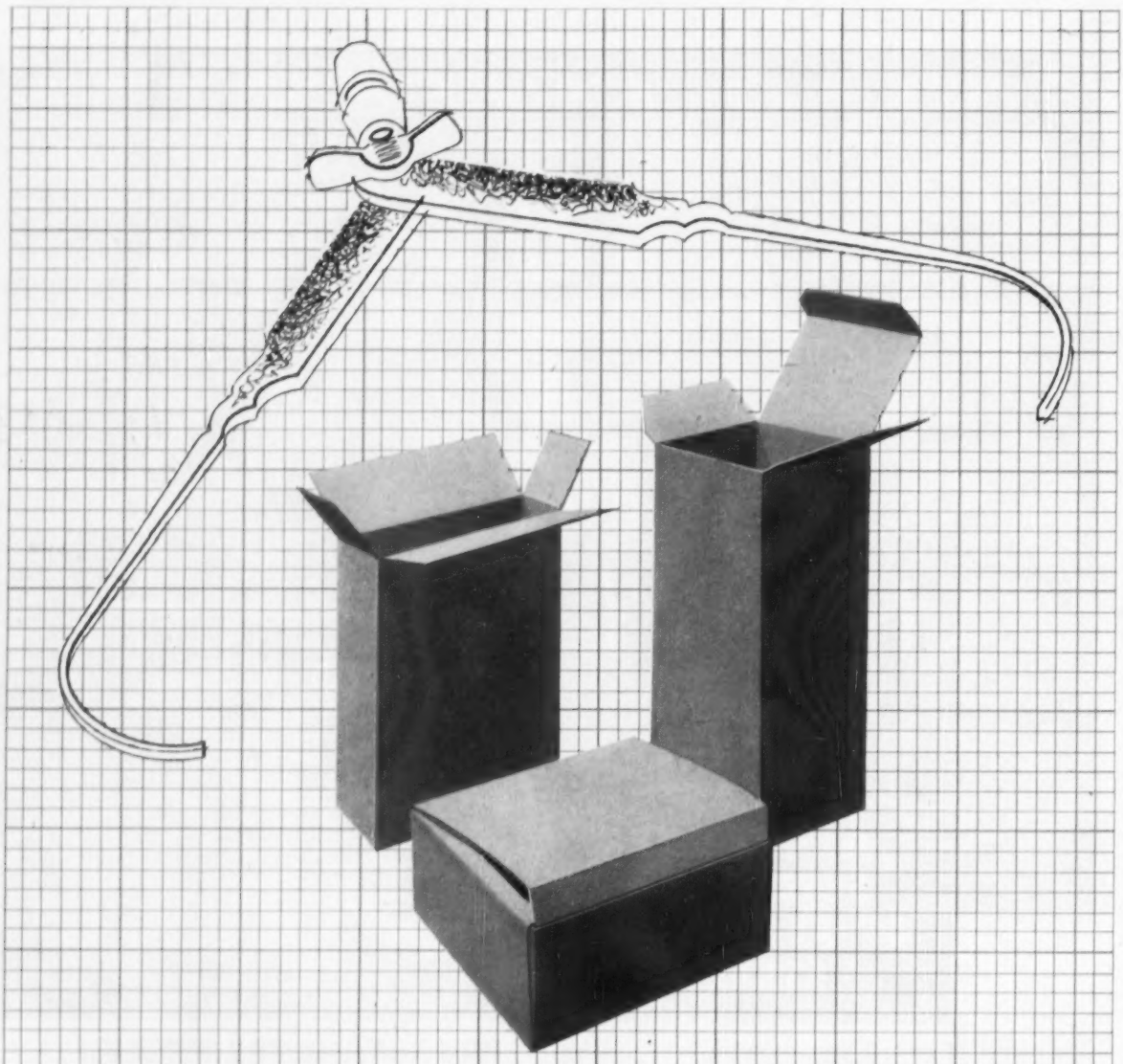

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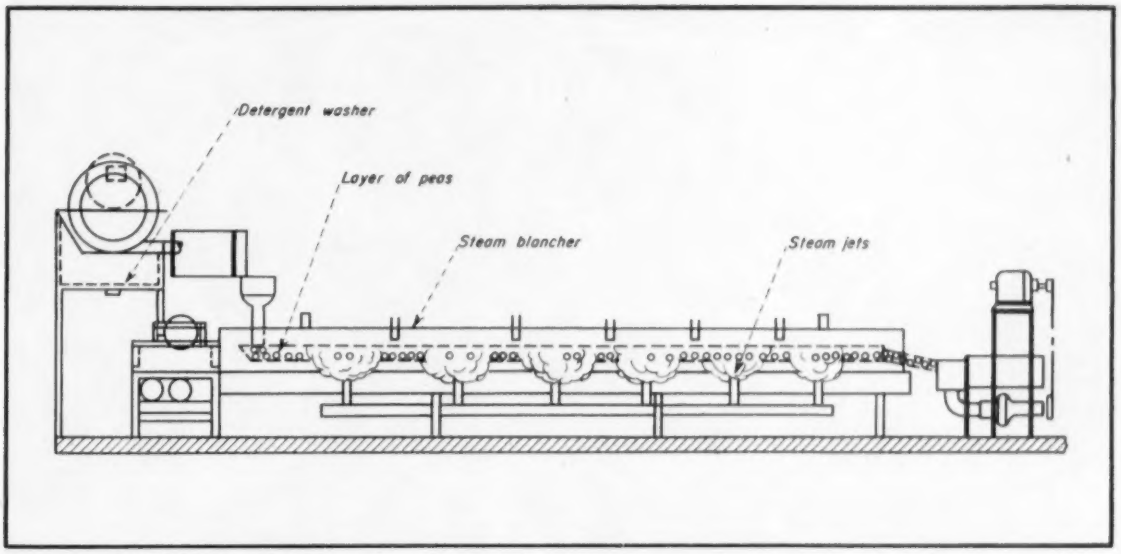

FIG. 1—ADVANTAGEOUS two-step washing and steam-blanching. Experimental steam blancher is shown schematically.

Experiments Reveal Benefits Of Steam Blanching Peas

Contamination by spoilage organisms reduced. More vitamins and sugar retained. Problem of viny flavor curbed by 2-step method

J. W. HOLMQUIST, L. E. CLIFCORN, DOUGLAS G. HEBERLEIN, CLARENCE F. SCHMIDT and E. C. RITCHELL

First four authors with Research Division, Continental Can Co., Chicago, last named with Green Giant Co., Le Sueur, Minn.

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The method has advantages over hot-water blanching, the standard procedure in preparing peas for canning and the more common method used by processors of frozen peas.

An over-all analysis of the blanching operation shows that it accomplishes two things simultaneously.

1. The *desirable actions* of enzyme inactivation and of washing to remove dirt, bacteria, and entrapped air.

2. The *undesirable action* of leaching out a portion of the essential nutrients in the natural product.

Consideration of these factors led to the view that blanching might better be done in two steps. One step would perform the function of washing. The other step would remove the gases and inactivate the enzymes.

A greater retention of nutrients would thereby be effected.

Experiments on steam blanching were initiated in 1947 by Continental Can Co.'s Research Division, in cooperation with Chain-Belt Co. and Green Giant Co., and continued through the 1951 season. A summary of the results of these experiments follows.

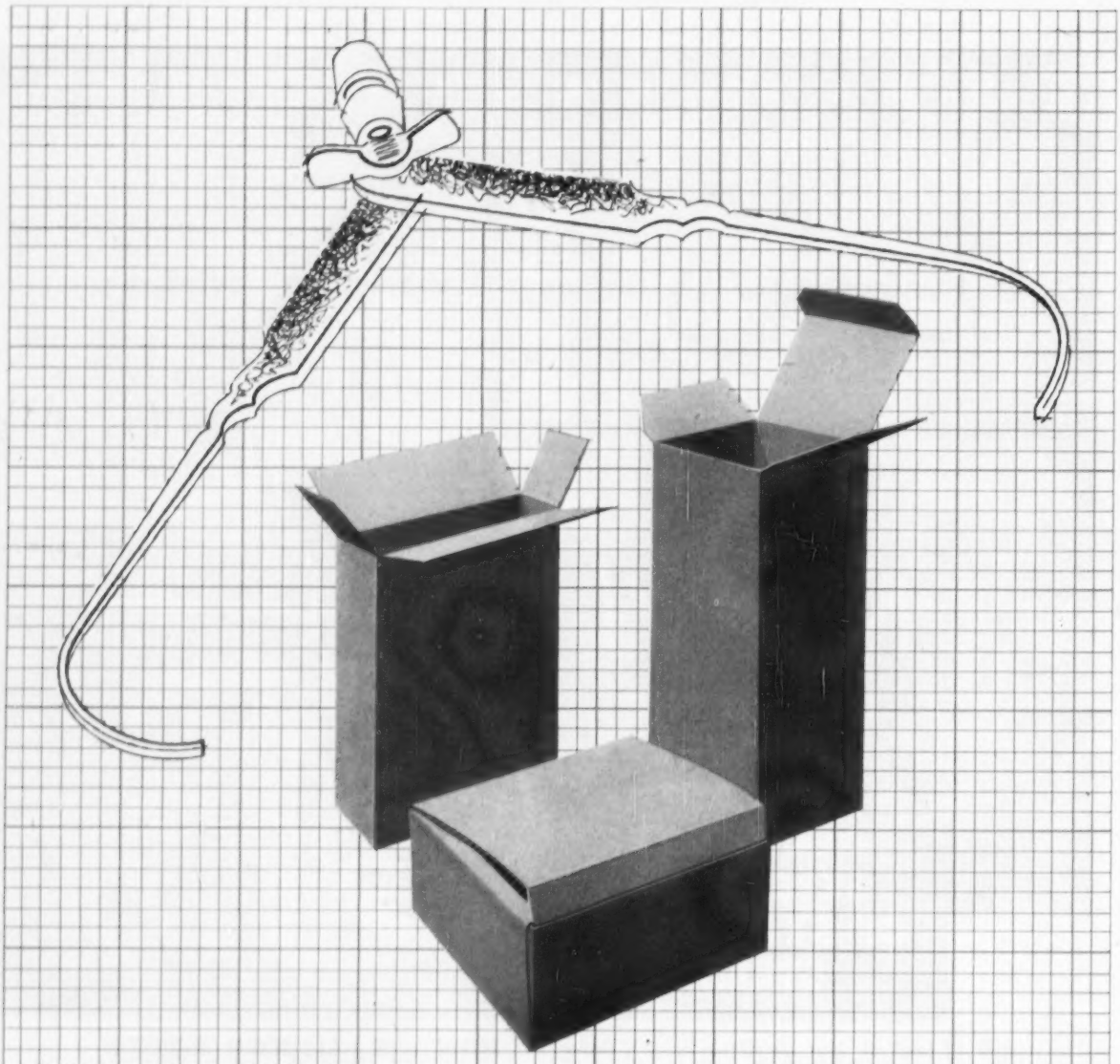
Bacteriological Evaluation

Repeatedly, over a period of many years, bacteriological surveys have shown that conventional hot-water blanchers are a source of thermophilic flat sour contamination. Sanitation programs are hampered by the inherent limitations in design of hot-water blanching equipment. In some instances, satisfactory operations are accomplished through extreme precautions and practices. But the over-all industry conclusion is that the present conventional hot-water blancher still accumulates a high level of flat sour organism contamination.

In addition to the potential danger from flat sour contamination, the blancher water is an ideal medium for the growth of thermophilic organisms through a wide range of temperatures. Considerable attention was therefore given to a bacteriological evaluation of the steam blancher used in the pilot-line operations (Fig. 1). (Commercial steam blanching equipment is not now available.)

The studies were conducted in 1949 and 1950, and several runs over significant periods of time were made to duplicate conditions which would be considered normal in full-scale operations.

Concurrent studies were made of the thermophilic flat sour spore contamination from the cannery's con-



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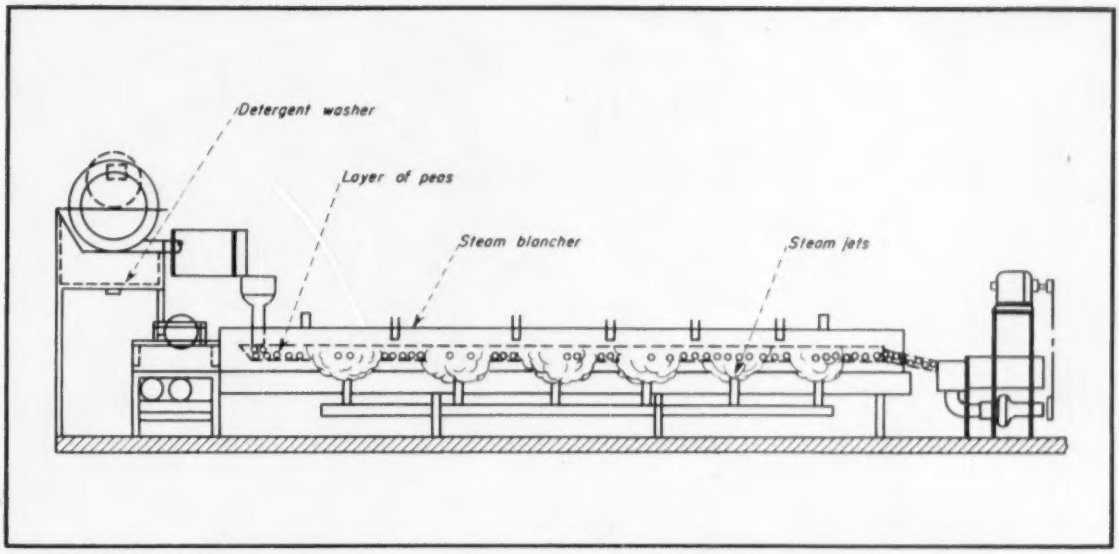

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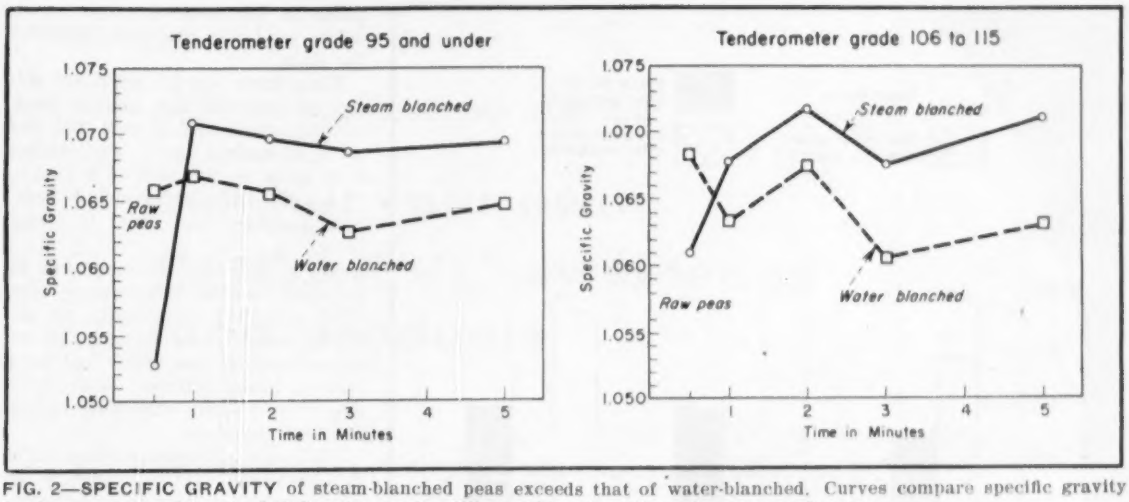

FIG. 2—SPECIFIC GRAVITY of steam-blanched peas exceeds that of water-blanched. Curves compare specific gravity for two grades of large-seeded Sweet peas for different blanching times in steam and water.

ventional-type hot-water blanchers.

In the course of the bacteriological surveys, samples of peas entering the steam blancher and the water blancher also were tested for thermophilic flat sours, all being found negative. The contamination of the peas leaving the blancher was measured by plate counts upon the washings from the peas and by a processed tube test.

There is a significant difference between the spore counts of peas leaving the water blancher in both the 1949 and 1950 seasons (Table I). Of the samples taken from the steam blancher during the 1949 and 1950 seasons, 69% and 85%, respectively, showed no spore count from the washings. This compares with 2% and 25% showing no spore counts in the water-blanched samples for the same years.

There also is a significant difference between the flat sour contamination of peas blanched in the steam blancher and those conventionally water blanched (Table II).

Quality Grading

During the continuous pilot-line operation, the steam-blanched peas were run directly through the plant quality graders regularly used for separating water-blanched peas. Since the same field-grade peas blanched in water had a significantly higher percentage of floaters than those steam blanched, it became apparent that the steam-blanched peas were not being effectively quality separated.

In the pilot-plant operations, the sinker fraction could not be kept separated from the factory run. It was quite obvious, however, that a high percentage of high-quality peas which had been steam blanched were in the sinker fraction.

That steam-blanched peas have a consistently higher specific gravity than water-blanched peas is shown in Fig. 2. In lots of peas of tenderometer grade 95 and under, the maximum density of both steam- and water-blanched peas was reached at the end of 1 min.

Maximum density of the more mature peas of tenderometer grade 106-115 was reached at the end of 2 min. The curves parallel each other, with the specific gravity dropping rather sharply to its lowest value at the end of 3 min. for both water and steam blanching. After blanching for 3 min., there was a gradual increase in density up to 5 or 6 min.

Since there was an increase in the density of steam-blanched peas over that of water-blanched peas, the brine density in the grader was increased until approximately the same percentage of floaters was obtained from the steam-blanched line as from the cannery water-blanched production line. In general, increasing the brine concentration from 3 to 6 deg. salometer for Alaska and Sweet peas will provide separation of steam-blanched peas approximately equivalent to comparable water blanched peas.

Efficiency of the adjusted quality separator brine was evaluated by determining the maturity grade employed in the U. S. Standards for Grades of Canned Peas under the Production & Marketing Administration of USDA. Maturity grades also were established organoleptically, observing the schedule of possible points in accordance with the US Standards. In addition, the alcohol insoluble solids were determined as an objective measure of maturity.

The comparative maturity grades of eight sets of paired samples of Sweet peas are given in Table III. Similar results were obtained with

TABLE I—SUMMARY of Distribution of Spore Counts of Samples of Peas Leaving Steam and Hot-Water Blanchers

Spore Count Per 303 Can	Percent of Total Samples			
	1949		1950	
	Water Blancher	Steam Blancher	Water Blancher	Steam Blancher
0	2	69	25	85
1–30	2	24	35	12
31–60	2	4	10	3
61–100	16	2	20	0
101–300	36	0	10	0
300+	41	0	0	0
Total Samples	39	89	20	34

TABLE II—RESULTS of Processed Tube Tests on Samples of Peas Leaving Steam and Hot Water Blanchers

	Total Number of Tests	Number of Tubes Positive	Percent Positive
Steam Blancher:			
1949	147	4	3
1950	96	1	1
Hot water blancher:			
1949	153	119	78
1950	102	42	41

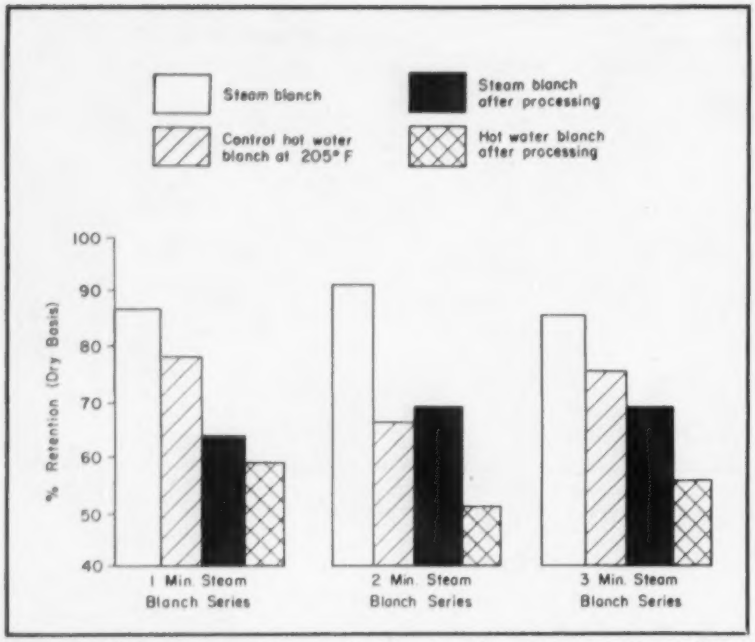

FIG. 3—MORE ascorbic acid is retained in steam-blanched peas. Chart shows effect of varying time on retention of the vitamin in Alaska peas, sieve sizes 1 and 2, tenderometer grade 95 and under. Percent retention is corrected for salt and sugar added.

various grades of steam- and water-blanched Alaska peas. There is reasonable agreement between the maturity grades of the steam- and water-blanched peas (as determined by salt-brine separation, organolepitc grades, and the percentage of alcohol insoluble solids).

Effect on Flavor and Texture

One of the chief objections to steam blanching of peas has been the viny- or grassy-like off-flavor in the final product as compared with peas conventionally water blanched. Preliminary tests confirmed that a good hot-water wash prior to steam blanching eliminated the off-flavor. But this practice essentially introduces a dual blanching operation, with the same potential undesirable bacteriological problems as now exist in conventional hot-water blanchers. Therefore, it was considered highly desirable to remove the material carrying the off-flavor by means of a suitable detergent in cold water.

No significant raw- viny-, or grassy-like off-flavor remained after detergent washing for 1 min. at 75 deg. Nor did any of the detergents used in the wash produce any significant off-flavors in the peas. No significant difference was noted between Nacconol NR and Nacconol SX in concentrations of 0.10% and 0.25%. Detergent washing at 160 deg. F. appeared to be more effective in eliminating the off-flavors than detergent washing at 75 deg. The difference, however, was not sufficient to justify a 160 deg. F. wash.

Treating peas with sodium hexametaphosphate in the preliminary wash to improve skin texture also significantly reduced the viny- or grassy-like off-flavors. Tests were made using various concentrations of sodium hexametaphosphate at both 75 and 160 deg. F. for ½-min. and 1-min. time intervals. With the same concentration, the hot-water wash was more effective than the cold-water wash. But increasing the concentration of sodium hexametaphosphate in the cold-water wash from 0.3% to 1.0% effectively softened the skins.

Since there was no significant difference between the sodium hexametaphosphate-washed peas and the detergent-washed peas, the studies were made on the basis of a 1-min., 75-deg. F. detergent or sodium hexametaphosphate wash prior to steam blanching.

In flavor testing the many lots of prepared samples representing the 1950 and 1951 experiments, no off-flavor was reported in any lot of steam-blanched peas which had been given a 1-min. detergent wash at 75 deg. F. or a 1-min. wash with sodium hexametaphosphate.

Thorough investigations were made to determine whether sacrifices in water-soluble vitamins could be minimized by the steam-blanching process. Retentions of ascorbic acid, thiamine, niacin, and riboflavin in different varieties of peas of various sieve sizes were determined. And the data for peas that were steam blanched for 1, 2, and 3 min. were compared with the figures for peas commercially blanched 5 min. at 205 deg. F. as the controls. Clearly significant in these comparisons was the trend for greater ascorbic acid retention by steam blanching. A sample of these results is shown in Fig. 3.

Ascorbic acid retention in steam-blanched peas, with and without detergent wash, also was compared with the retention in hot-water blanched peas. The tests showed that a 0.25% Nacconol wash (at various times and temperatures) preceding the steam blanch, had no deleterious effects on ascorbic acid retention.

It is interesting that the blanching *per se* showed 14.5% greater retention of ascorbic acid in the steam-blanched samples than in samples hot-water-blanched for 5 min. at 205 deg. F. It was observed that upon canning and processing, the ascorbic acid retention decreased somewhat to a difference of 9.0%, but this still is significant.

Similar studies with Sweet peas showed that the average difference in percentage retention of ascorbic acid after steam blanching and hot water blanching was 10.2%. This compares with 9.9% retention in the canned product.

Although a slight savings in thiamine content could be demonstrated for the steam-blanching process, the destruction of this vitamin by the heat process nullifies any savings in this nutrient which may have been accomplished by the improved blanching process.

Niacin and riboflavin retentions of steam- and hot-water blanched

TABLE III—Maturity Grades of Steam- and Water-Blanched Sweet Peas* (Floater Fraction) After Seven Months' Storage

	1950 Studies: 8 Sets of Paired Samples	
Maturity grade	Steam Blanch	Water Blanch
PMA—Average	43.25	42.3
Range	43.44	42–43
Organoleptic		
Average	37.7	36.7
Range	36.7–38.6	36.5–37.2
Percent A.I.S.		
Average	11.25	11.7
Range	10.3–12.3	10.8–12.4
Flavor test	No off flavor	No off flavor

* Tenderometer grade 96–105; ungraded for size.

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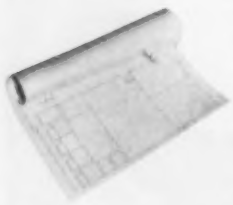

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canned processed peas were determined, but no significant differences could be detected.

While the studies on nutrient preservation were limited to vitamins, the authors have reason to believe that one of the greatest savings of nutrients in the steam-blanching process may be in a saving of sugar.

This highly important constituent of vegetable juice is readily leached from vegetable tissues during the hot-water blanch.

In large-scale commercial canning operations where sugar is used in the brine, the savings in sugar alone could amount to a large sum of money.

Studies at the USDA Western Utilization Research Branch on steam-blanching peas for freezing showed a 5% loss in total solids content, the greater portion of which undoubtedly is sugar.

With hot-water blanching, extraction losses of an order of 5% to 30% may be expected.

Incidentally, the leaching of a smaller amount of water solubles from the peas is one factor in explaining why their density is higher after steam blanching than after hot-water blanching.

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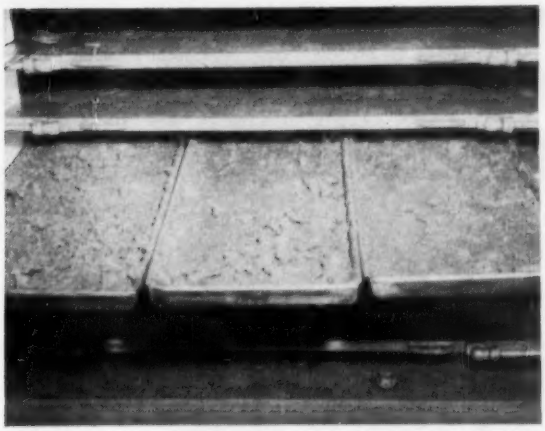
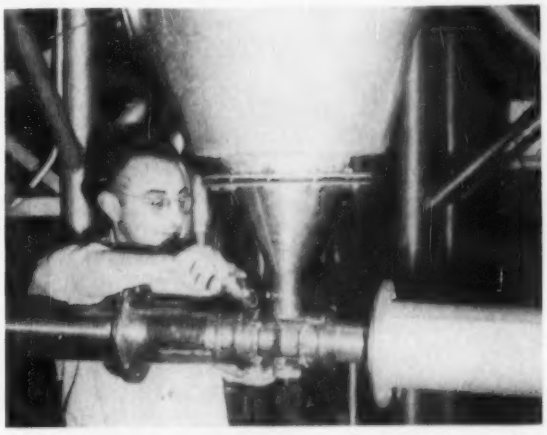


VACUUM dryer converts concentrated tomato juice to dry, puffed product with good characteristics.



SPRAY dryer also successfully produced tomato powder, but it took innovations to overcome problems.

Good Tomato Powder Made Experimentally

Produced at WRRL with modified vacuum and spray procedures and equipment

FLAKY, QUICK-MIXING tomato powder that makes highly palatable juice now can be produced. That is the conclusion to which experiments have led at USDA's Western Regional Research Laboratory in Albany, Calif.

Trick is to use a modification of methods successfully applied in the vacuum dehydration of orange juice to produce a puffed powder with very low moisture content (FE Mar. 1953, p. 59).

And a modified spray drying technique also looks promising.

With tomato concentrate as the raw material, puffing under vacuum does not take place readily. Under conditions satisfactory for fruit concentrate, tomato concentrate becomes a hard glassy substance that is extremely difficult to remove from trays.

This difficulty was first overcome by a two-step procedure. Pulp is separated from single-strength tomato juice in a centrifuge. The liquid then is vacuum concentrated to about 60% solids.

This material dries readily in a vacuum chamber, with a sponge-like structure. It crushes readily to a powder and mixes with water instantly.

Consistency of the separated pulp is adjusted by addition of serum (single-strength) until it will flow easily on tray surfaces. This vacuum-dries with a small amount of puffing—and the powder mixes quickly with water. Powders from pulp and serum (ground to pass 0.016- and 0.048-in. screens, respectively) are mixed in natural proportions to make the final powder.

To avoid the two-step process, the laboratory workers tried beating air into whole tomato concentrate to the point of a meringue-like consistency, and then drying it under vacuum. The one-step process was found to be practical and promising from the cost standpoint when concentrates containing 25 to 38% solids were used.

Further, spray-drying also has produced a product with good quality and free-flowing characteristics. The powder has a greater packing density than the vacuum-dried product, but it mixes with water less readily.

One of the spray-drying difficulties which had to be overcome is tendency of the warm particles to stick together and accumulate on the walls of the dryer and in the powder-collecting system. This tendency is reduced if the tomato juice is made by the hot break process (to preserve most of the natural pectin unchanged. And there is less sticking when the amount of salt normal for a beverage juice is added.

A small amount of bisulfite also is put into the concentrate to stabilize the product against heat damage in the dryer.

Further control of sticking has been accomplished by other innovations. Air at room temperature is admitted into the lower part of the dryer body to cool and condition the surfaces of the powder particles before they enter the primary cyclone collector. Then a stream of cool dehumidified air picks up the powder from the base of the first collector and conveys it to a final collector, accomplishing some additional drying on the way.

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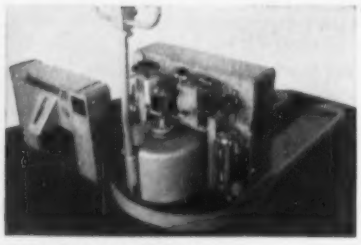

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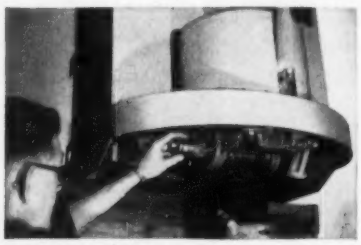

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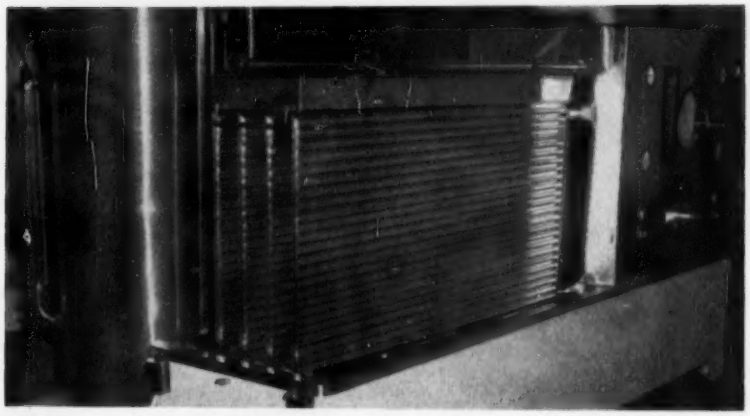
Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 14, Michigan

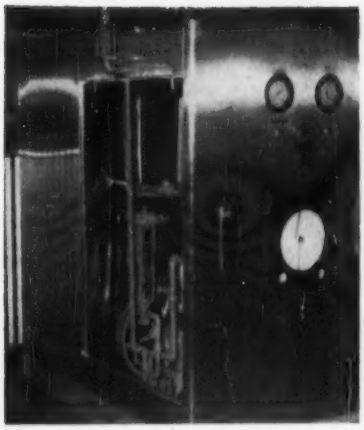
CLARK® EQUIPMENT

New Automatic Units

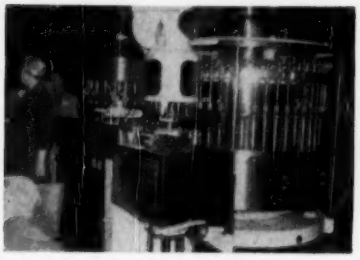
Viewed by bottlers at ABCB show in Philadelphia



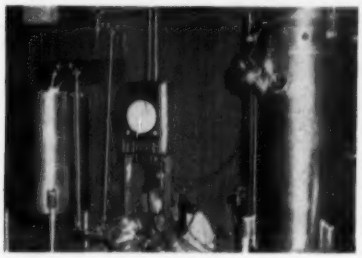
UNIFORM BLENDING and filling off carbonated beverages at high speeds are possible with new Uni-Blend bottling system. Pictured is Tri-O-Matic cooler that proportions syrup and water, then cools, pre-carbonates and carbonates mixture. Refrigeration unit, high-speed filler complete system: Crown Cork & Seal Co., Baltimore. (113A)



FOR plants desiring pre-blend system using present cooler, carbonator, filler, the Redi-Mix unit uniformly proportions syrup and carbonated water, supplies filler. Made in 5 sizes: Kol-Flo Kooler Co., Bayonne, N. J. (113B)

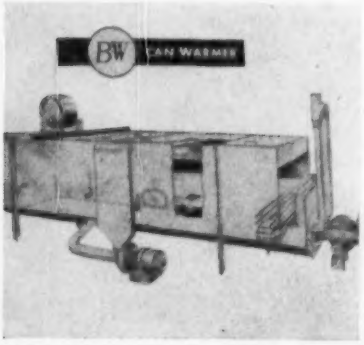


ACCURATE syrup delivery, counter pressure carbonated water feed that eliminates agitation in bottles are advantages of low-pressure fillers made in 5 models—24 to 60 spouts: The Liquid Carbonic Corp., Chicago. (113C)



LARGE capacity, small size feature new Filmflo deaerator. Sensitive controls maintain water level within narrow limits. Atomizing nozzles aid sanitation: Metal-Glass Products Co., Belding, Mich. (113D)

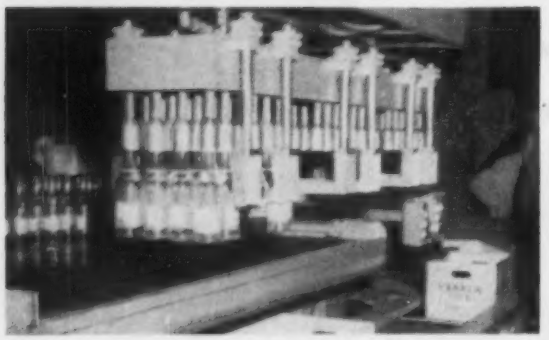
VERTICAL, single-shelled 3,500-gal. stainless tank for liquid sugar or corn syrup. Also built in sizes from 750-gal.; horizontal tanks, 500-5,000 gal.: Cherry-Burrell Corp., Chicago. (113E)



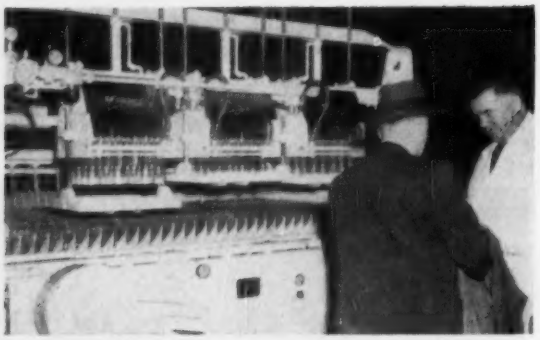
LOW-COST can warmer designed to raise beverage temperature approximately 50 deg. was shown schematically by Barry-Wehmiller Machinery Co., St. Louis. (113F)

MULTI-UNIT cartoning of canned products at speeds up to 900 per min. is possible with Cluster-Pak machine. Cans enter in single row, are combined in two rows, grouped in package units, then carton is folded around, locked. May be glued, too. Handles flat or cone top, 6 oz.-1 qt. cans. Packs single or double row, 2-12 cans in bundle: Atlanta Paper Co., Atlanta. (113G)

Automatic Uncasing, Casing, Palletizing Units

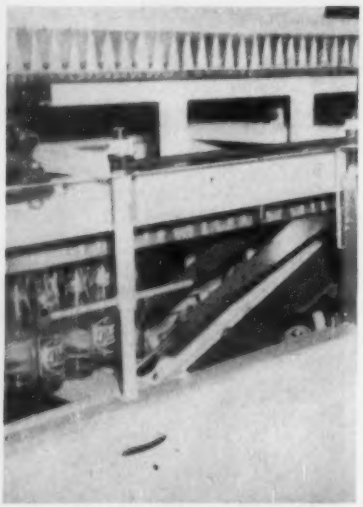


NEW uncaser-soaker-feeder employs centering bells with pneumatic gripper operating on pressure to align and engage bottle necks. Handles half- and full-depth cases: Yundt Bottlematic Corp., Cincinnati. (114A)

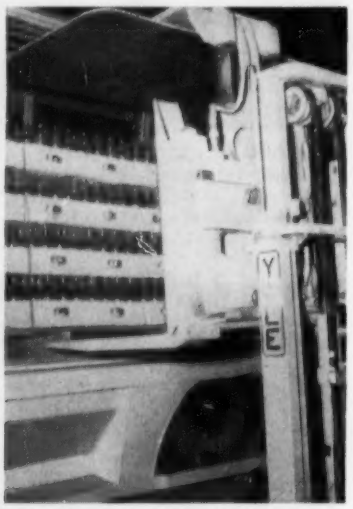


HIGH-SPEED (up to 500 bpm) unloading of half or full-depth cases is possible with Dumore unloader. Air operated jaws remove bottles, set them on washer feeds: Geo. J. Meyer Manufacturing Co., Cudahy, Wis. (114B)

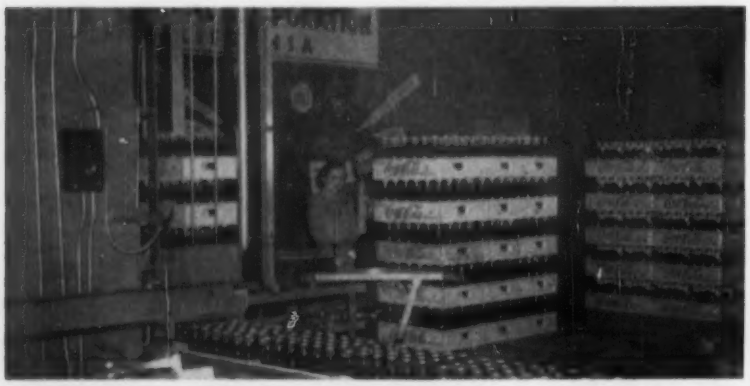
HALF-DEPTH uncaser uses V-belts to lift and move bottles to transfer tongue, where belts spread, ease them on conveyor. Handles 500 bpm.: The Liquid Carbonic Corp., Chicago. (114C)



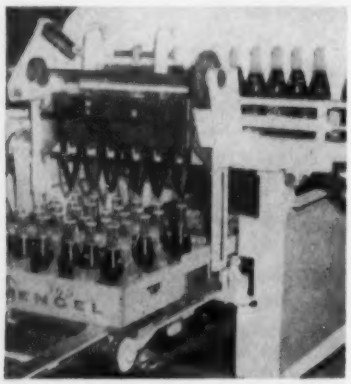
UNIVERSAL uncaser for half cases quickly adjusts for botles 7½ to 10 in. high. Employs finger chain to gently lift bottles. Speed to 500 bpm.: Radio Corp. of America, Camden, N. J. (114D)



HYDRAULIC STABILIZER for fork truck applies firm pressure on pallet load, enabling tilting forward to place in body. The Yale & Towne Mfg. Co., Philadelphia. (114E)

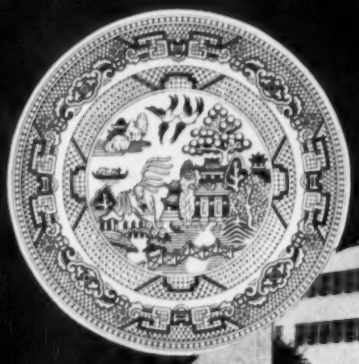


PALLETIZER for all type cases stacks to predetermined height, accumulates stacks on pallet, delivers filled one to discharge conveyor. Rollers automatically feeds empty pallets: Food Machinery & Chemical Corp., Riverside, Calif. (114F)



CASE packer automatically handles 180 bpm. (6 or 12 oz): Dacam Corp., Charlotte, N. C. (114G)

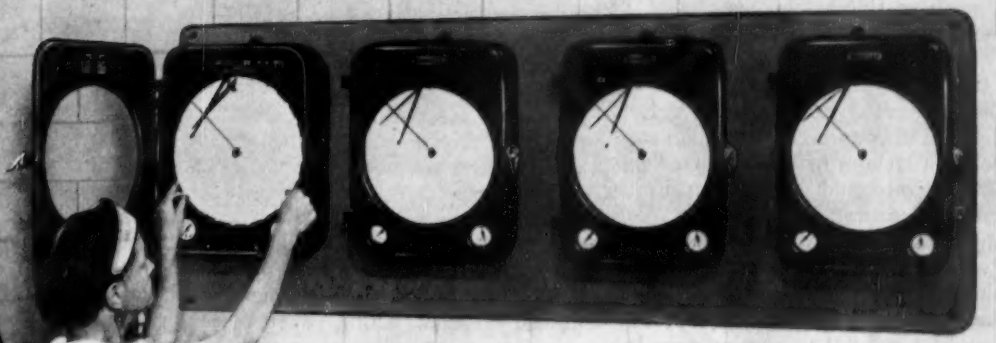
For More Details, Circle Key Numbers on Readers' Service Card



BLUE PLATE FOODS, Inc.

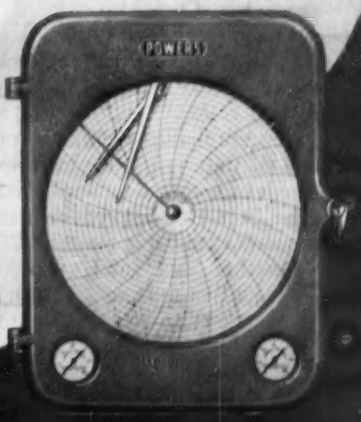
SHOW PLANT IN NEW ORLEANS, LA.

Gets UNIFORM Quality Products and Increased Plant Efficiency with POWERS Automatic Temperature Control



POWERS Recording Controllers at left prevent overheating and eliminate boilover of jellies and preserves processed in steam jacketed kettles used in this modern plant.

Exact Control of Heat Exchanger which maintains vegetable oils at proper temperature is regulated by a Powers No. 26 Regulator controlling both inlet and outlet valves on heating and cooling water.



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If UNIFORM Quality of Your Product is dependent upon exact control of TEMPERATURE or HUMIDITY use Powers automatic control. It often pays back its cost many times a year. An experienced Powers engineer will gladly help you with your control problem. Contact our nearest office or write us direct.

(b87)

Established in 1891 • **THE POWERS REGULATOR CO.** Skokie, Ill. • Offices in 60 Cities

In Behalf of Progress . . .

Technical Tempo To Be Fast One in 1955

Year by year, food manufacturing becomes more exciting, more challenging, more rich in opportunity. This year will be no exception. Pace-setters will be watching a host of technical developments. Let us consider some of them to get the feel of the times.

Strides in moisture removal point up challenging opportunities. The economics of packaging, storing, and shipping dry and partially dehydrated materials and products never were more inviting.

Revival of some techniques introduced during World War II, together with more recent innovations, are worth study. Vacuum evaporation of moisture from vegetables and fruits is one of these. Dehydrated French-fry-cut potatoes of good quality, and easy to reconstitute, were produced by vacuum evaporation about a decade ago. Then vacuum drying was applied in the Freeze-Vac method by which celery was frozen—a notable achievement.

A decade back, most food freezers were not impressed. Loss of weight impaired salability, in their opinion, even though quality was tops.

Now partially dehydrated frozen foods are back in the limelight. Dehydrofrozen vegetables and fruits are attracting a lot of attention as ingredients for other processed foods. And one canning firm is selling dehydrofrozen peas to steamship lines, pointing to the institutional market. The peas are dried to 50% of the weight at 120 deg. F., then frozen.

Both dehydrofreezing and freezing by vacuum evaporation merit close investigation.

Progress in converting fluids to powder is no less significant. Orange powder is being produced by continuous vacuum evaporation. This stems from puff drying in vacuum cabinets, and takes advantage of a new belt-type dryer first used to produce, soluble coffee.

Successful introduction of extremely soluble dry non-fat milk is further testimony to the import of trends in moisture removal. And we understand that even beer is powdered experimentally by a novel process of removing moisture in the frozen state.

Another "hot" unit operation is size reduction. The fact that nutritious beverages can be made from whole fruit by comminution shows what can be achieved.

Also, one of the long-time shortcomings in food manufacturing methods has been the need to take raw materials apart, make different products out of different portions, and throw some parts to waste. Another serious shortcoming has been the use of raw materials in forms difficult to process and fabricate at high efficiency. Size reduction is helping to lick these problems.

Mixing is another one to watch. Progress embodied in continuous mayonnaise and marshmallow manufacture is about to be supplemented by continuous production of bread dough commercially. When the design and performance details of the mixers involved are revealed, give them the closest scrutiny.

Much has been achieved, too, in proportioning ingredients—more is soon to be announced. And when you put together the latest in size reduction, proportioning, and mixing you have at your disposal the means with which to revolutionize big areas of food manufacturing.

Steady progress in automatic process control is a piece of the same pattern. And you want to keep an eye on advances in continuous, in-process measurement and control of product characteristics, such as pH and density.

Here in rapid-fire order are several more examples of technical pace-setters meriting attention: Electrostatic smoking has been applied to bacon, as a basically new coating process. Canned hams are sterilized experimentally in a high-frequency electrical field, a challenging heating method. Ultrasonic waves are working in German brew kettles as a versatile new extraction method. Can fillers and closers are operated at new performance levels by a hydraulic motor, a flexible new drive for food machinery. Two new films, Mylar and radiated polyethylene, have unique strength and temperature characteristics, and so have exciting potentials as packaging materials. Closely controlled flow through small, specially formed passages permits short-time, high-temperature processing of ice cream mix—a step ahead in heat transfer. Temperatures of materials in process are being quickly reduced by vacuum evaporation, a cooling technique with a fast future.

Progressive companies are going to bulk handling and shipping of materials like flour, sugar, shortening, and chocolate. So also are they mechanizing sanitation with pressure cleaning devices and insecticide foggers.

And they are passing up no opportunities to control processes automatically and to robotize mechanical functions like machine loading and conveyor transfers.

The most intriguing technical prospect we have saved until last—cold sterilization by beta or gamma rays.

Millions are being spent to study the difficult side-reaction problems. But the first application likely will be light surface treatment to increase product shelf-life without side reactions. Don't be surprised if this comes reasonably soon.

With all these potentials for progress—plus many not mentioned—your competitors can go a long way in 1955.

Celite Filtration provides:

Brilliant polish—at fastest flow rates

QUALITY THAT SPEEDS SALES, by a filtration method that speeds production . . . this double advantage is yours with Celite* diatomite filtration.

You obtain brilliant polish, because Celite removes even the finest suspended impurities. Yet you secure the fastest flow rates consistent with desired quality, because a Celite filter cake contains millions of microscopic filter channels per sq. ft. of surface. For example, with a typical syrup, you can achieve excellent clarity at a flow rate of 10 gal/sq ft/hr—using a standard grade of Celite!

Production men also favor the Celite method because of its simplicity. It may be used with any type of conventional filter unit, and it is almost automatic in operation. For maintenance work too, Celite Filtration is the economical, efficient way to obtain pure process water for bottle washing, equipment cleaning and other service functions.

Because of its many advantages Celite Filtration is used by most sugar refiners and brewers, by leading bottlers of soft drinks, processors of fruit juices, cooking oils, fats . . . and many other products.

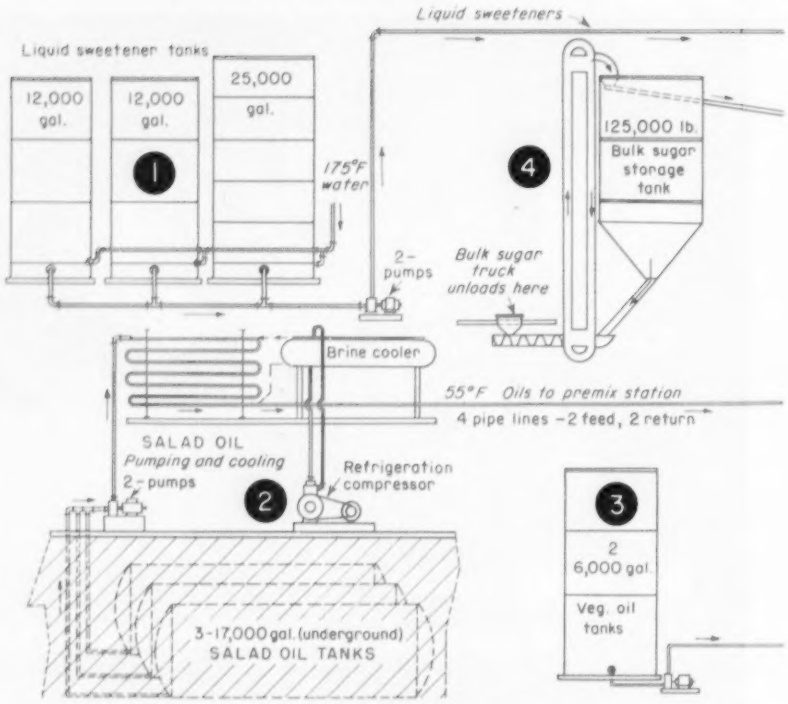
How can Celite aid your product or process? A Johns-Manville Celite Filtration Engineer will gladly show you, without obligation. Simply write Johns-Manville, Box 60, New York 16, N. Y. In Canada, 199 Bay St., Toronto 1, Ontario.

*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

JM PRODUCTS **Johns-Manville CELITE** FILTER AND PRESSING AIDS

Line Engineering for Flexibility

Northwestern food company makes 47 products on 5 versatile lines. Employs straight-through operation, central controls, palletized handling



WHAT ADVANCED line design can do—beginning at raw-materials receiving, carrying through handling, and going on to shipping of 47 different food products—is strikingly evidenced in Nalley's, Inc., Tacoma, Wash., plant.

All of the foods are produced on these following 5 major lines: Syrup, mayonnaise, potato chip, canning, and pickling. Those on each individual line are, of course, compatible to this particular process.

Liquid sweeteners, received in tank cars, are first steam heated then pumped to storage tanks—Point (1) on accompanying flowsheet. Here they are held at 110 F.

Oil for mayonnaise and salad dressing is received in tank cars and unloaded by gravity to underground tanks. Here, its temperature is maintained at 55 F. And when cooling

For story behind this unique operation see p. 85.

is required, the oil is pumped through refrigerated coils (2). Oil for potato chip frying is pumped from tank cars to surface storage tanks (3).

Incoming bulk sugar is unloaded (4) at 40,000 lb./hr. Two methods are employed: Mechanical and pneumatic. In the former, sugar is moved by screw conveyor and bucket elevator. Pneumatic line blows it (3 psi.) into storage tank.

Individual Processes Pinpointed

Syrup Making starts with metering 180 F. water to one of the four cookers (5). Bulk sugar is weighed and chuted to it, then steam (80 psi.) is turned on and agitator started. Other ingredients are added and, when 215 F. is reached, steam is shut off. Following holding for 3-min., syrup is pumped to canning (6) and bottling lines (7).

Salad Dressing. First step is production of a starch slurry by metering water to tank (8) and adding starches under agitation. Other ingredients are added and, when finished, slurry is pumped to supply tank, then on at 5,000 gal./hr. through Votators (9), where it is heated to 197 F., cooled to 90, discharged to hold tanks.

There are 4 premix tanks (10) where starch paste and other ingredients are mixed to form salad dressing, then pumped through colloid mills at 7,000 lb./hr., and discharged to jar filler (11) operating at 115/min.

Potato Chips. Potatoes are emptied in raw vegetable dump and elevated to abrasive peeler (12). Following inspection and trimming, they are sliced, washed under high velocity water sprays, and conveyed to the fryer.

This new unit (13) has a separate oil heater in which temperature may be automatically, efficiently controlled. Slices drop in 340-350 F. oil, are moved forward by paddles and wire mesh belt, then discharge onto drain belt and go to salter. They are then weighed and filled (14).

Cannery comprises 4 preparation lines—sauce-gravy, beef stew vegetables, meat, and beans—that converge in one mixing-filling line.

1. In making sauce-gravy, spice-mix and flour are dry-mixed, then water is added to produce a smooth paste. This is pumped to a mixing kettle and water and tomato sauce are added to make 150 gal., followed by heating to 180-190 F. Batch is pumped to elevated tank, then flows to unit that fills cans ¼ with gravy.

2. Fresh vegetables are peeled, cut into ¾ in. chunks (16), combined with frozen peas then with meat.

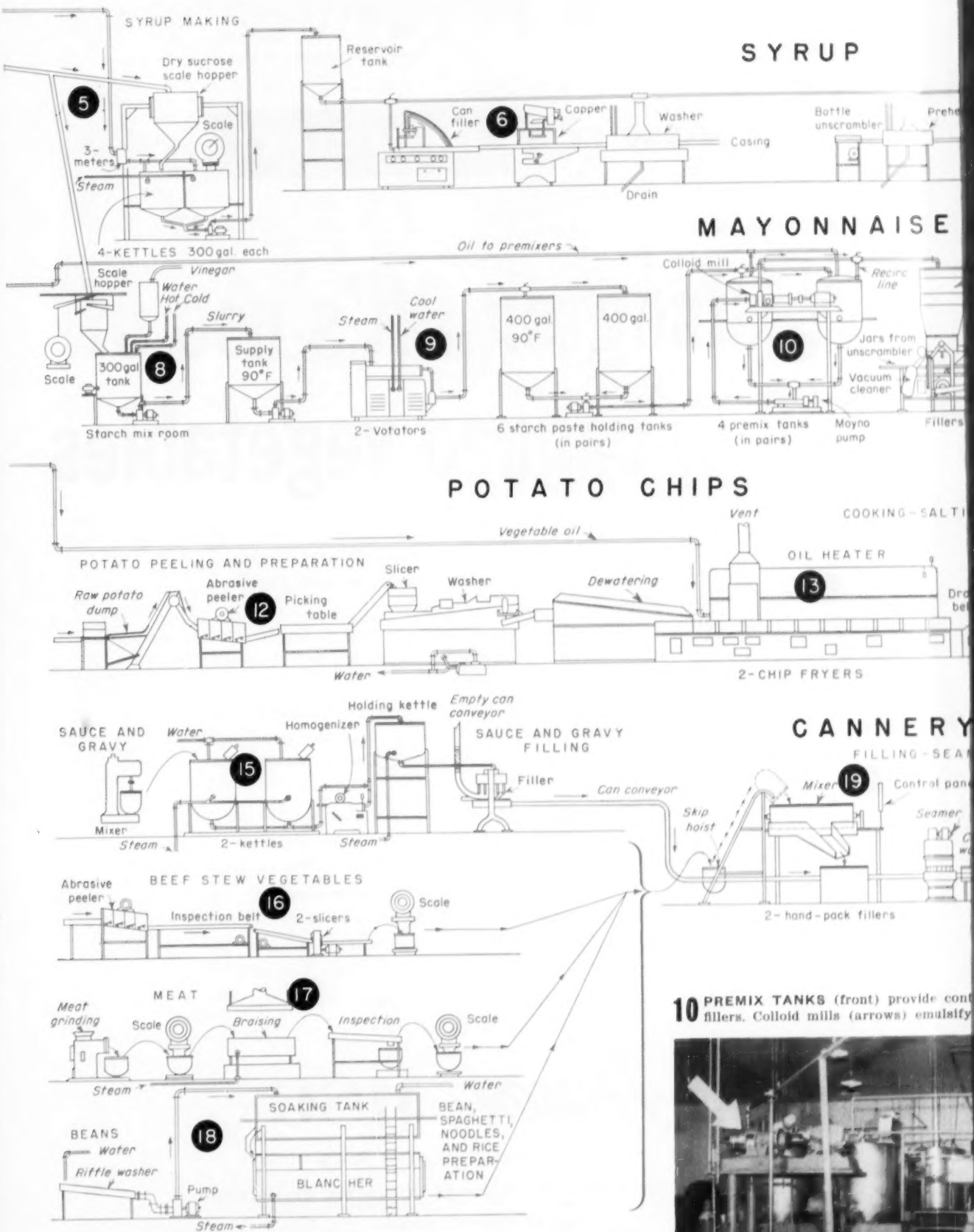
3. Boned meat is ground, braised (17) for 15-min., weighed, and added to the mixed vegetables.

4. Beans are hydro-conveyed from a riffle-washer to tank directly above the blancher and soaked in 80 deg. water overnight. Water is drained, beans washed in cold water, dewatered in perforated chute as they drop to blancher. Following blanching (5 min. in 200 F. water), they move under cold water sprays are then added to other chili ingredients.

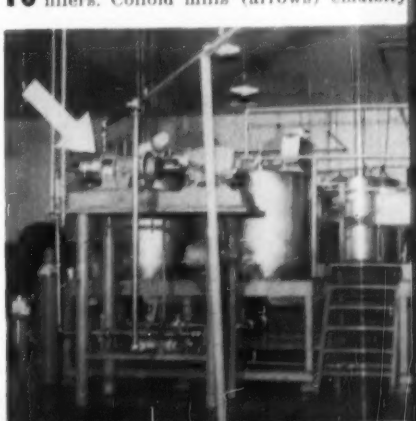
Products to be canned are blended in mixer (19), then chuted to hand-pack fillers. All operations in this department are controlled from central panel at mixer.

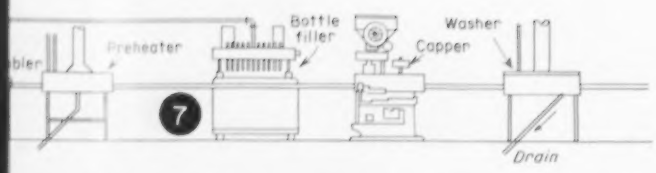
Pickles—sliced, fresh-pack sweet—are made from graded cucumbers that are washed (20), sliced (21), inspected, soaked 30 min. in 30 deg. salometer brine, mixed with fresh onion slices, and hand packed in glass jars (22).

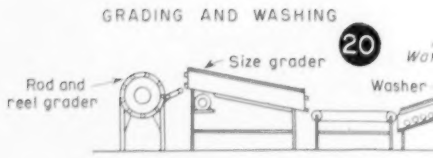
Jars move to liquor filler, then are head-spaced, capped, pasteurized in walking-beam exhaust box at 190 F.(23), pre-cooled, cooled to 120 F. Jars are air dried, labeled, cased, palletized.



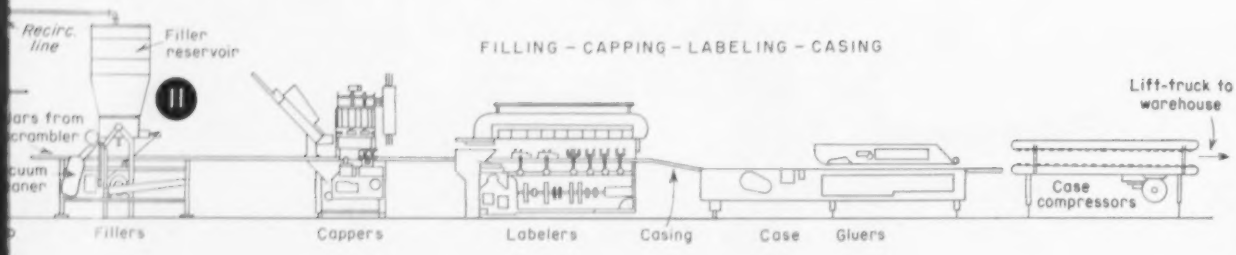
10 **PREMIX TANKS** (front) provide cont
fillers. Colloid mills (arrows) emulsify

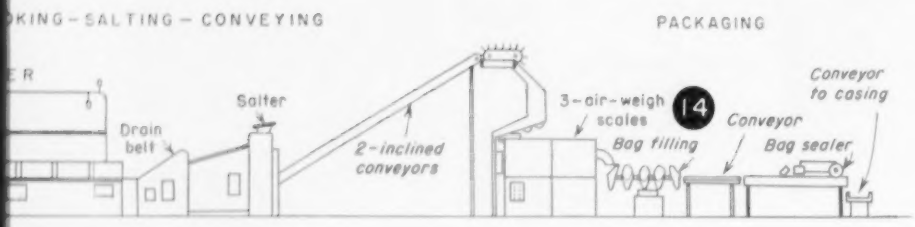






AISE AND SALAD DRESSING





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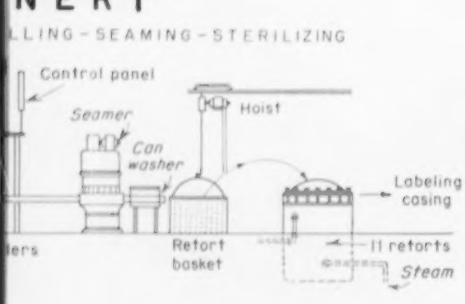
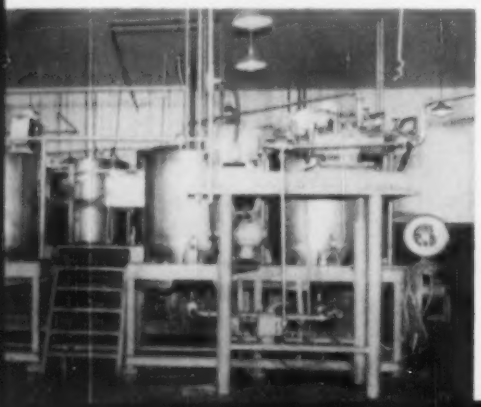
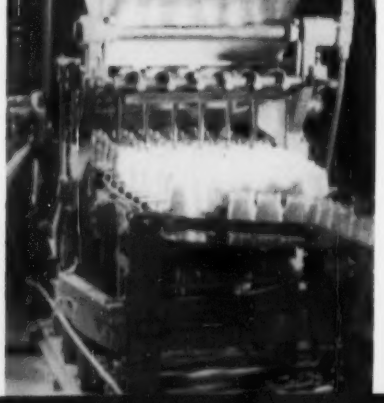


) provide continuous supply of salad dressing to
ows) emulsify and stabilize the mixture.

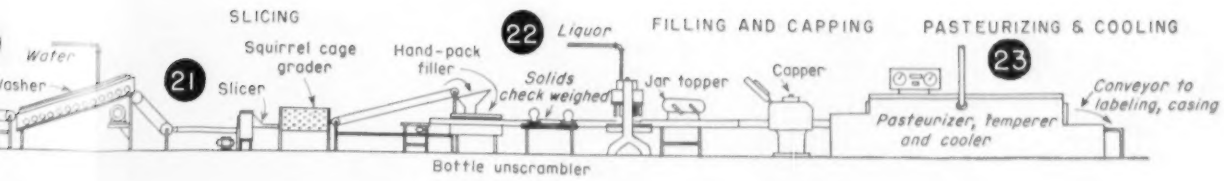


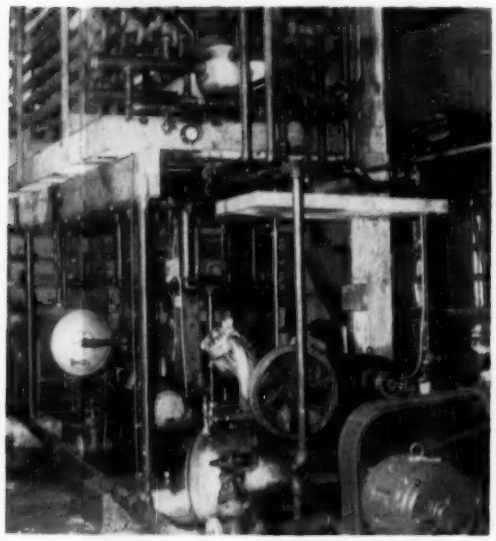
11 **LARGE HOPPER** above 6-spout filler acts as reservoir, evens out production surges.



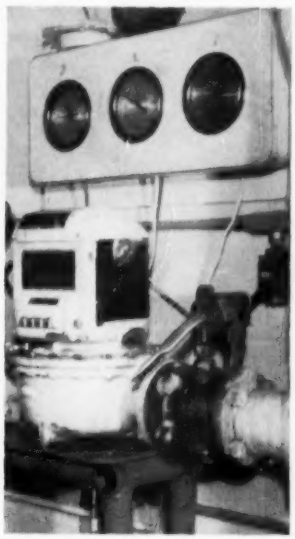
13 **POTATO CHIP FRYER** employs c
circulation through unit (left) and
performed as chips fall from conveyor

PICKLES





2 **REFRIGERATED** heat exchanger (top) cools oil to 55 F. enroute from underground storage tanks to processing.

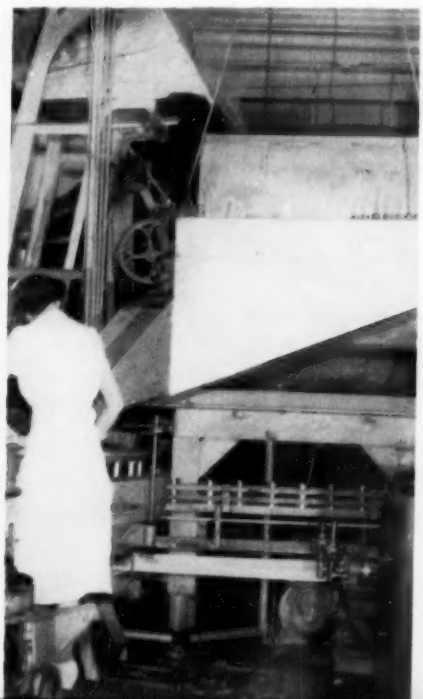


5 **METERS,** recorders, valves, switches, convenient to operator, speed syrup makings.

8 **LIQUIDS** are metered, starch and flavors weighed in slurry tank for salad dressing making. Oil goes in premixing tanks (10).

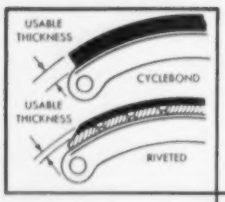
oys controlled heating of oil by) and back to kettle. Salting is eyor (right).

19 **MIXER** on platform (right) receives chili from skip-hoist (top left). When mixed it is chuted to filler.



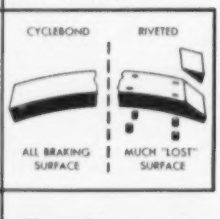
22 **HAND-PACK** filler is served by 4 conveyors—2 bring pickles to packers, 1 brings jars, 1 removes filled jars, feeds liquor filler.

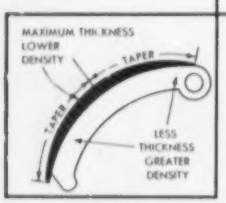
Another typical example of Dodge truck's extra-value engineering



More usable thickness.
Dodge truck Cyclebond brake linings can be used virtually through their full thickness. This gives the linings many thousands of miles of added life. Riveted linings should be worn only to rivet heads.

More usable surface.
Every square inch of Cyclebond lining area is braking surface. Riveted linings, because of rivet holes and mitered ends, have up to 10% less braking surface.





Tapered for easy stops.
Cyclebond lining is more tightly compressed at ends, gives a gradual taper. Thick center of lining makes first contact...increased pressure brings the ends into contact. Braking is smooth, even.

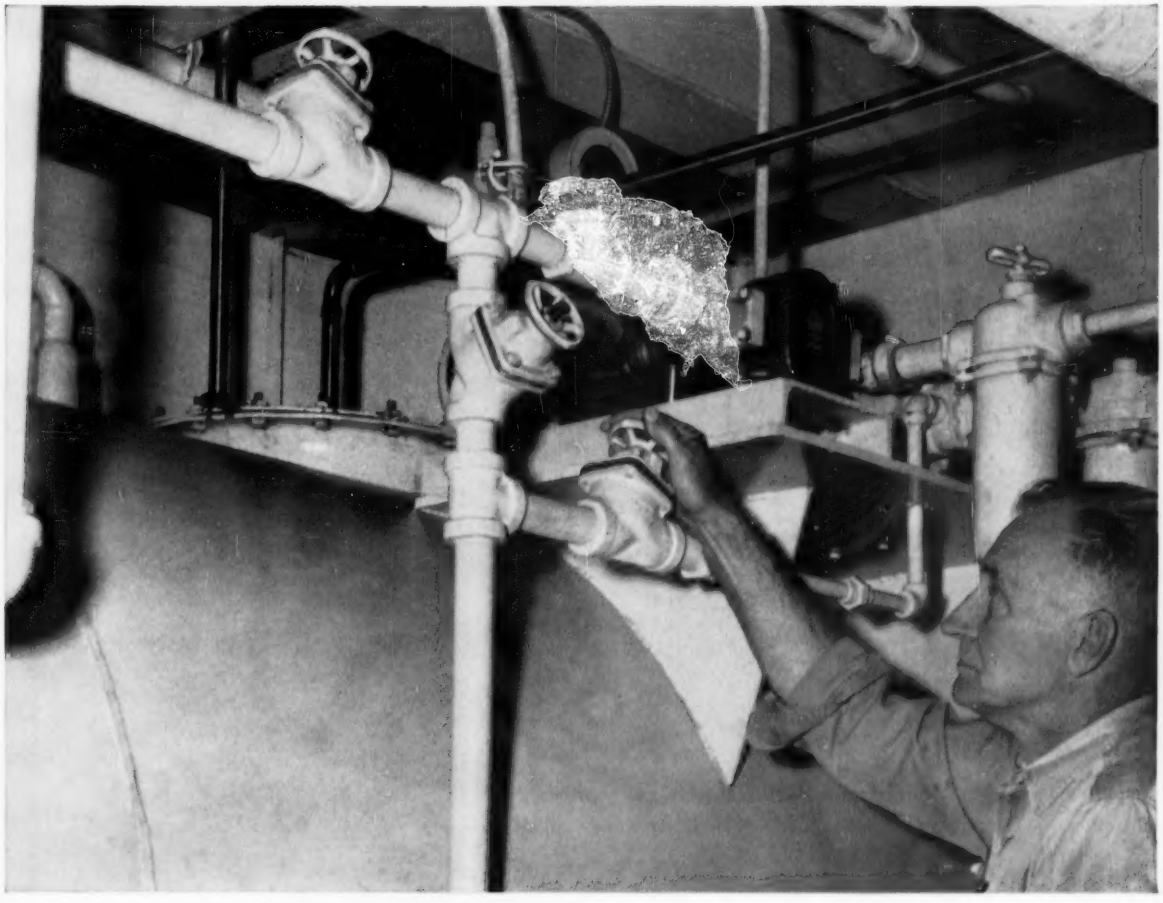
Why you go more miles before relining with Dodge truck brakes!

You can be sure of lower brake maintenance, more miles before relining, with Dodge truck brakes and famous Dodge truck Cyclebond linings. And that's in addition to the quick, positive stops, the smooth action, for which Dodge truck brakes are famous.

Long-lasting, reliable brakes are just one example of the extra-value engineering that means more for your money when you buy . . . more money saved over the life of your truck. Get the facts on how extra-value engineering saves you money; see your dependable Dodge Truck dealer.

DODGE "Job-Rated" TRUCKS

A PRODUCT OF CHRYSLER CORPORATION



Light oil meets its master in these CRANE VALVES

THE CASE HISTORY— Read how the Johnson & Johnson baby products plant at Cranford, N.J., completely stopped a valve leakage condition that wasted product . . . caused a safety hazard . . . and menaced the plant's high sanitation standards.

Valves formerly used on very light baby oil lines were the source of trouble. Keeping them tight at the stuffing box was next to impossible. Constant servicing of stuffing boxes was necessary, even after repacking every 4 to 8 weeks. Several packings were tried without success while the high maintenance costs and nuisance conditions continued.

Early in 1951 the plant found the solution in Crane No. 1610 Packless Diaphragm Valves. They removed the cause of leakage —immediately stopped its troubles and costs. Almost 4 years later—with no maintenance whatsoever—the Crane packless valves remain absolutely tight; continue giving perfect service. And that goes for all valves added since the first installation.

Crane No. 1610 Packless Diaphragm Valves

When you have valve problems with hard-to-hold fluids, try Crane *Packless* diaphragm valves. They eliminate stem leakage and maintenance on air, vacuum, gas, light oil and similar services. Their diaphragm has longer life, yet should it fail, their separate disc prevents escape of line fluid. Available in wide selection of materials and sizes. Ask for folder AD-1942 or see your Crane Representative.

CRANE CO.

General Offices: 836 S. Michigan Ave., Chicago 5, Illinois
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VALVES • FITTINGS • PIPE • PLUMBING • HEATING

CRANE'S FIRST CENTURY . . . 1855-1955

For more information, use coupon on last page.

NOW IT'S OFFICIAL!

Washington OK's use of MSG in canned vegetables

Huron's ready to provide you with all the technical facts and figures you need to take fast advantage of this new ruling by Food & Drug Administration.

If your canned vegetables have been standing on the sidelines while other foods enjoyed the flavor-boosting feature of MSG, now's your chance to put them back in the running.

Test after test has proved that MSG-treated foods *always* rate the nod over untreated foods. You'll build in consumer preference that's practically guaranteed when you add MSG to your canned vegetables.

What's more, recent investigation shows that there's more MSG (a natural component of many foods) in fresh vegetables than in over-mature vegetables. So when you *add* MSG in the canning process, you're actually adding freshness to your product!

Let our Technical Service fill you in *right now* on tested and approved treatment levels for MSG, as well as adapting your equipment to its use. The Huron Milling Co., 9 Park Place, New York 7, N. Y.

B.4.25

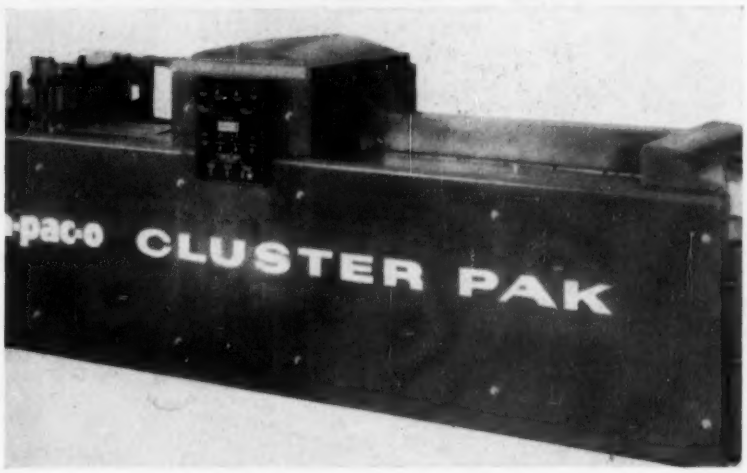
Huron **MSG**

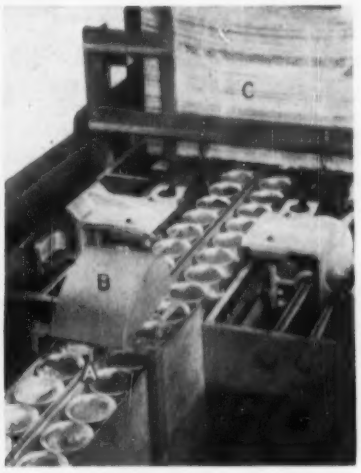
PURE MONOSODIUM GLUTAMATE 99+%

Made by the American pioneers in protein derivatives

FACTORIES: Harbor Beach, Michigan
SALES OFFICES: 161 E. Grand Avenue, Chicago 11 • 607 Second National Building, Cincinnati 2 • 383 Brannan Street, San Francisco 7

NEW EQUIPMENT & SUPPLIES





New Unit Bundles Cans at High Speed

Versatility and economy, as well as higher speed, are reported for a new bundler that automatically wraps cans into 100% Kraft multi-unit cartons at rates up to 900 per min. And machine is seen applicable to other types of packaging.

Called Cluster-Pak, it handles a variety of products such as beer, soups, frozen juices, dog food, soft drinks, evaporated milk, and baby foods and is equipped to take all sizes of round, flat, or cone top cans from 6 oz. to 1 qt. Highest speeds are obtained when wrapping is in double rows, but machine may be adapted from 2 x 2 production to single file. Thus ten combinations of units, ranging from two cans to twelve, may be packaged.

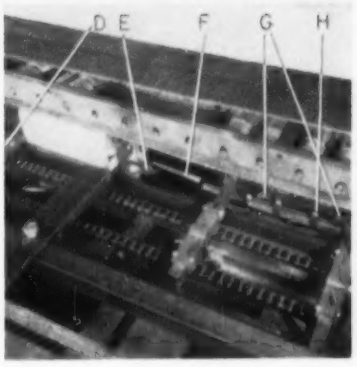
Cans enter machine's intake conveyor and are divided into two rows by spring-loaded separator (A). Conveyor, traveling at about 1½ times the speed of the bundler, has smooth stainless steel top surface which slides freely under cans to permit continuous flow.

Containers then pass under two micro switches (B) which stop the machine immediately if there is a break in the line. This assures a full group of cans in each package. Machine will start automatically when can line is refilled. Cans now pass under feeder hopper (C) which normally holds 600 carton blanks. Teflon-covered plungers (not shown), carried on roller chains and traveling at the same speed as the cans, are pushed in between the cans from each side, grouping them into package units.

A feeder ejects one carton blank at a time from hopper onto feeder chains. Hooks, engaging trailing edge of each carton, carry it along on top of a group of cans until the blank passes under a pressure belt. Latter holds paper tightly across top of cans until carton is formed. Folders are timed to strike ends of the paper protruding over the cans and to make straight folds down the sides.

Each group of cans is now engaged by rear plungers (D), and carried on the folder sword (E). Paper flaps protruding below cans now strike folding bars (F) which fold them up against bottom of sword. Group slides off sword, leaving carton wrapped around cans, ready to be tightened and locked. If glue is also desired, it can be applied when the cartons are locked.

Packages then run out on tightening chain where tightening lugs (G) enter wedge-shaped holes in bottom of carton. Guide bars force lugs toward center line of package as it travels forward, tightening carton around cans. While tightening lugs hold package in perfect alignment, locking fingers (H) strike lock on bottom of carton, forming the lock and completing package.



Power requirement is small. Each machine contains a ¾ hp. vacuum pump motor and a 1½ hp. main drive motor. Intake conveyor motor is ¾ hp.—*Atlanta Paper Co., 950 W. Marietta St., N. W., Atlanta 2, Ga.*

Circle 125A on Reader Service Card

Heat-Impulse Sealer Has Magnetic Pressure Unit

Automatic holding of plastic packages for uniform 9-in. seals without side pressure or pull is the feature of this new magnetic-bar, heat-impulse sealer. Called Ectromag, it permits operator to use both hands for positioning an item. Then, after a foot pedal is pressed, remainder of sealing cycle is automatic.

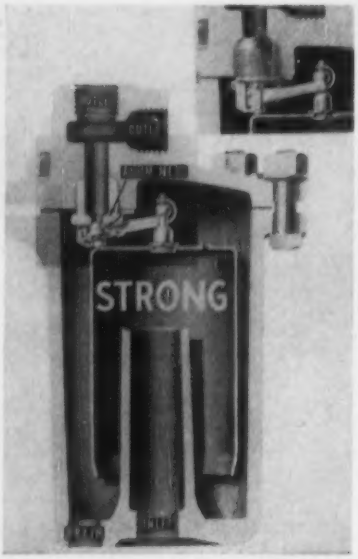
Pressing the pedal moves a hinged pressure bar to a partially closed position, which actuates a microswitch to energize the magnetic circuit. This draws the bar tightly against a heating element. At the same time, an adjustable automatic timer is energized. It initiates and controls the impulse cycle, at the end of which the bar opens, releasing a cleanly sealed product. Sticking between product and heating element is prevented by a built-in buffer strip.

For operator safety, there is no exposed hot element to burn fingers.

Nor is there danger of pinching since the magnetic circuit is not actuated until the pressure bar reaches a point within ¼ in. of closing.

Unit is contained in a small compact housing and may be mounted in any required position. It weighs 30 lb. and operates on 115v. a.c.—*Electronic Processes Corp., 1094 San Antonio Rd., Los Altos, Calif.*

Circle 125B on Reader Service Card



New Steam Traps Have Wide Operating Range

High efficiency under all condensate load conditions and low maintenance cost are cited as unique features of this new line of steam traps. Known as Hydro-Flex, they are designed to operate at pressures up to 2500 psi. and temperature to 1100 F.

A dual fulcrum that powers the trap's valve lever enables efficient handling of very low condensate loads, yet permits high flow rates when required. This unit includes a primary high leverage fulcrum for cracking the valve from its seat. Then a secondary low leverage fulcrum opens the valve wide for maximum unrestricted flow.

For low maintenance, all internal working parts are of heavy stainless steel and are designed to withstand severe service. Bucket is deep drawn with no seams or joints and there are no removable pins.

Complete line is available in semi-steel, cast steel, and forged steel construction.—*Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland 13.*

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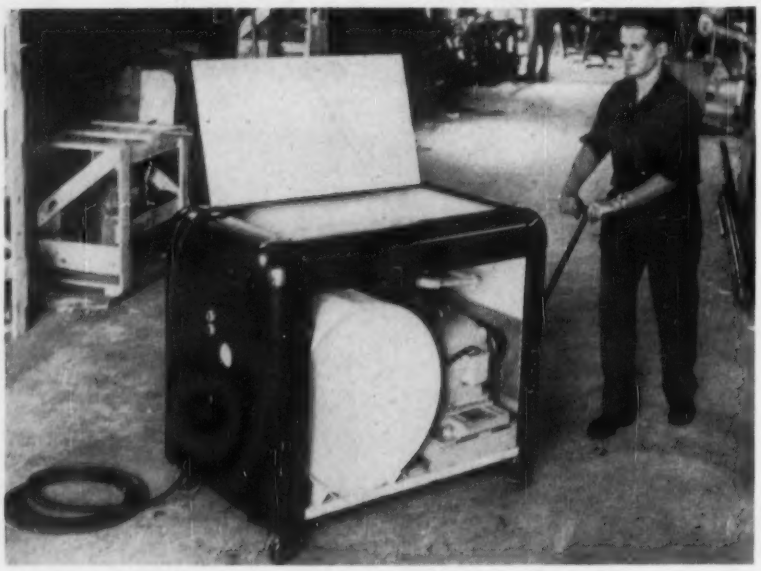


Movable Vacuum Pump Has Many Applications

Designed for use with equipment such as presses, sealers, concentrators, or driers, this new vacuum pump unit may be moved to any spot in a plant to meet production needs. Up to 29½ in. of vacuum at sea level can be produced and easily controlled.

Called VacForm, it is housed in a metal cabinet with removable panels, and mounted on a heavy steel frame with convenient top-opening door. Rubber-tired wheels on swivel casters permit easy handling by one operator, and wheel locks keep the unit from slipping when installed.

In operation, pump is connected by heavy-duty hose to whatever equipment is to be used. Pump wagon, adaptable to varying electrical requirements, is merely plugged into an ordinary electrical connection and the unit is ready for use. Further simplifying operation is a system of start-and-stop push-button controls, easily accessible for the operator.

Setup includes: air-cooled rotary pump with automatic lubrication; a vacuum gage; adjustable vacuum shut-off switch; 50-gal. welded surge tank with bottom drain; and 3 hp. motor with dual V-belt drive. Other features are thermal overload protection for the motor and an exhaust filter that eliminates need for either an indoor or outdoor vent.

Unit weighs 900 lb., is 3½-ft. high, and requires only 4 x 2½-ft. of floor space.—*Vacuum Forming Corp., 76 S. Bayles Ave., Port Washington, N. Y.*

Circle 126B on Reader Service Card

Self-Laying Track Dolly Handles Heavy Loads

Moving massive equipment in a plant is a slow and cumbersome job that reportedly may be eased with use of this Multiton roller skid capable of supporting a load of 50 tons. It is seen reducing down time for set-up personnel who often must wait around while rigging crews move machinery with conventional pry and roller bars.

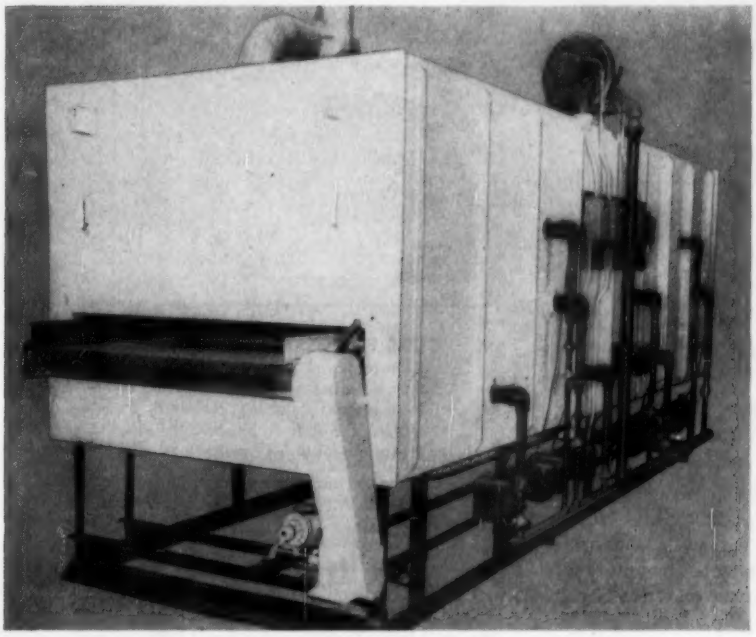
Unlike axle-type carriers that make single point wheel contact with the floor, this portable skid operates with self-laying track consisting of an endless chain of heavy steel rollers. These are joined by link courses around the centerpiece of an alloy steel frame. Its side members are spanned by end crossbars and a turntable with hardened gripping teeth is mounted on top of the frame. Completing the assembly is a separately furnished connector attachment for the cross-bars.

In operation, a wooden frame is placed under equipment to be moved. As several skids are moved under the load, the gripping teeth on the skid's turntable imbed themselves securely into the wooden frame. When the load is pushed or towed, skids move forward by laying the rollers ahead of them, as on a tractor. To turn the loaded skid, operator places a length of pipe over the shank of the connector and attaches it to one of the unit's crossbars. With this leverage, the skid is easily turned in relation to the load. In this way, it is possible to turn a machine completely around on it own length.

Because of special design, unusually heavy weights may be supported by so small a unit. Load resting on the turntable is transmitted down the side members of the frame onto a cross member that is in direct contact with the rollers. And latter's large bearing area permits high compressive loads to be transferred to the floor.

Another advantage of the self-laying track principle is that the actual floor on which the skid travels is the centerpiece of the frame. Since at least 9 in. of the roller are in constant contact with the floor, cracks and gaps are easily bridged to allow unimpeded motion.—*Stokvis-Edera & Co., Port Washington, N. Y.*

Circle 126C on Reader Service Card



Compact Oven Ideal for Limited Plant Area

This new 3-pass "tumbling" oven is designed for uniform and continuous baking in a limited floor space. Tumbling feature is said to be a marked improvement over conventional single-pass ovens that hold layers of raw material stationary during baking.

Oven consists of a direct gas-fired heating chamber that houses a stainless steel mesh conveyor system. Raw items enter at the top and descend on three conveyors that run the length of the oven. Thorough baking and constant texture result as products make three separate passes under a series of controlled gas burners. Tumbling action is achieved when baked goods drop from tier to tier at the end of each conveyor. And this action is said to eliminate scorching of the product.

Compact unit packs 135 sq. ft. of baking area into a floor space 4 x 16-ft. Flexible design permits easy integration into any production line with output ranging from 300-700 lb. per hr.—*R. G. White Mfg. Corp., 101-18 97th Ave., Ozone Park 16, N. Y.*

Circle 127A on Reader Service Card

Safely Handles Loads Inside Motor Trailer

The low step plate on this new standup end-control fork lift truck allows the operator to maneuver his load in a motor transport without worrying about head clearance. Specially designed for use on congested platforms the new unit is called the Docker. Four wheel suspension and a low center of gravity give the unit great stability and safety.

Truck has rated capacities from 1,000 up to 3,000 lb. Two studs on the truck's uprights are provided to pull or drag loads which are too heavy to be lifted.

New step plate, only 7 in. off the ground, is not only convenient safety-wise, but it cuts operator fatigue from constant mounting and dismounting common to loading dock operations. Operating controls are located in rear, allowing operator easy accessibility from either side of truck.

Despite unit's compact size, it has room for batteries up to 600 amp per hr. capacity which are capable of running a full 8 hr. shift without recharging. Provision has been made for immediate access to all operating parts for quick maintenance.

Truck is available with either mono-lift or duo-lift uprights. The ram arrangements on both hydraulic systems are directly interchangeable. Conversion into either lift system may be done in the field instead of at the plant.

Truck features a lift speed of from 45 to 65 fpm., depending on load. It has a 55-in. free lift with a full 107 in. telescopic lift on the duo-lift model.

Which is your drying problem?

- ☐ SLOW START-UPS
- ☐ ERRATIC TEMPERATURES
- ☐ LOW OUTPUT
- ☐ UNEVEN DRYING
- ☐ PRODUCT SPOILAGE
- ☐ HIGH STEAM CONSUMPTION
- ☐ VARIABLE DRYING RATES

Often the solution is simple and inexpensive...

While it's human to blame these dryer problems on the dryers themselves, the truth is that they're often due to...

...use of the wrong type of steam trap, causing equipment to waterlog... or heat-robbing air in steam spaces ...or wasteful, unreliable, manual temperature control.

Any one of these could cause poor dryer performance... loss of production, product spoilage, waste of manpower and steam.

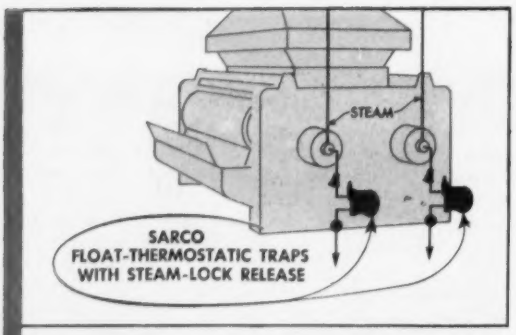
See (right) how simply and inexpensively these troubles have been cured by Sarco products and know-how. Tell us about *your* problems and we'll be happy to put our 43 years of experience to work for you. Just call your nearest Sarco representative, or write Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

SARCO

improves product quality and output

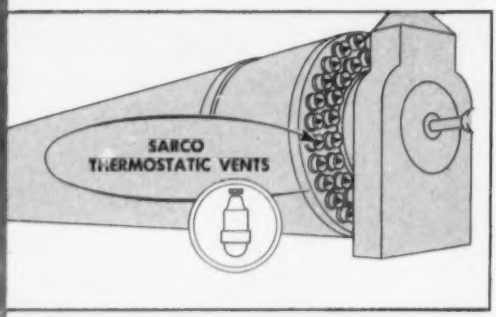
2101-B

Sarco has a wealth of helpful information on trapping, air venting and temperature control. Tell us about your problem – we'll be glad to send you this information and case history solutions to problems similar to yours.



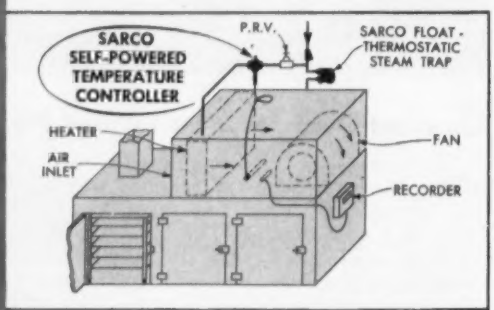
SPOTTY DRYING ELIMINATED: This atmospheric double drum dryer periodically waterlogged because of steam-lock in syphon pipe. Cold spots on drum surfaces, uneven drying and production slow-downs resulted.

By simply replacing the original traps with Sarco Float-Thermostatic Traps equipped with built-in steam-lock release valves... these drying troubles were completely eliminated.



CURE FOR SLOW WARM-UP: When air gets into steam spaces of a dryer it forms a heat-insulating film between the steam and heat-transfer surfaces... efficient transfer of heat from steam is impossible. Result: slow warm-up; prolonged drying time.

Simple, inexpensive cure for this condition are Sarco Air Vents, such as installed on above rotary steam tube dryer.



TEMPERATURE PROBLEMS SOLVED: Manipulating steam valves to control temperature wastes manpower and steam... is often the cause of product spoilage.

Sarco Self-Powered Temperature Controllers, as on this tray dryer, solve this problem ...hold dryer at maximum temperature without danger of overheating. Inexpensive, simple and dependable.

It is 53⅜ in. long, plus load length. Horizontal travel speeds range from 4½ to 6 mph.—*Automatic Transportation Co., 149 W. 87th St., Chicago 20.*

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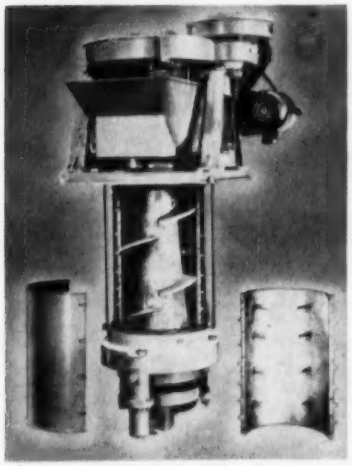


Pulp Dewatering Press Has High Capacity

High capacity separation on fruit, vegetable or other pulps is achieved with this dewatering press.

While capacity varies widely with nature of product, in terms of sugar beet pulp this press will process approximately 400 tons per hr. with low moisture. Overall height of press is 14 ft. 7 in., with drive, feed hopper and upper spindle assembly carried on a rigid pedestal and floor base. Required floor space is 7 x 6 ft.

Feed hopper, split for easy removal is available open as shown, or totally enclosed and with large screen surface for high moisture, or with screw conveyor feed for low moisture products. Outside housing and screen both are made in halves to permit easy access to screen and to spindle, respectively.

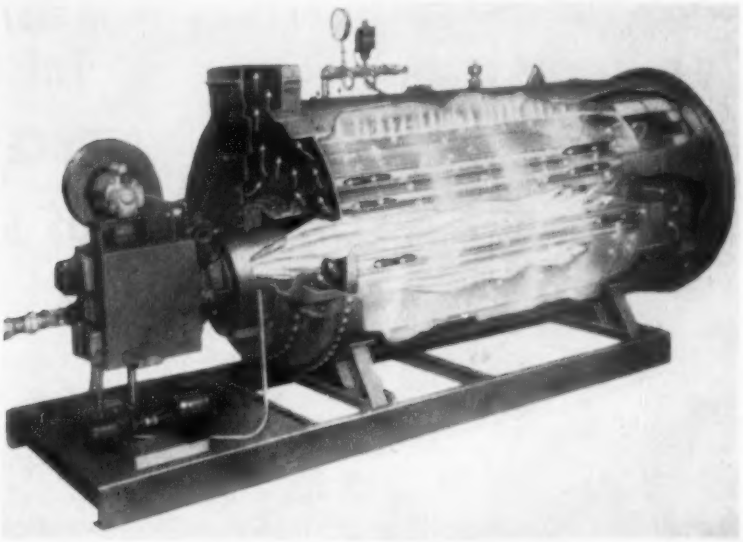
Spindle is in two parts, flanged and bolted together at floor line. This construction permits spindle repairs without dismantling drive. Top part of spindle is keyed to spur gear in speed reducer, with ball bearings top and bottom to take thrust from spindle. Spindle does not revolve on adjusting cone but on a removable shaft extension positioned in a bearing which is a part of press bottom.

All castings are high tensile strength Meehanite (cast iron). For presses handling corrosive products, all parts in contact with product can be furnished of stainless steel.

Adjusting cone is supported by three stainless steel bolts with bronze nuts for convenient adjustment. When required, cones can be equipped with pneumatic or hydraulic cylinders for automatic adjustment.

Drive consists of a spur-bevel gear reducer, torque-arm reducer, and V-belt to a standard 15 hp. 1,200 rpm. motor. Other drives suitable for motors up to 25 hp. are available. Gears are cut tooth, of Meehanite, cast steel or forged steel, heat treated as required and mounted on heavy ball bearings in a rigid oil-tight gear case. Upper part of two-part spindle and complete reducer are shop assembled. Other models, with approximately ¼th and ⅛th capacity of the standard press are included in the line.—*The Stearns-Roger Mfg. Co., 660 Bannock St., Denver 4.*

Circle 129A on Reader Service Card



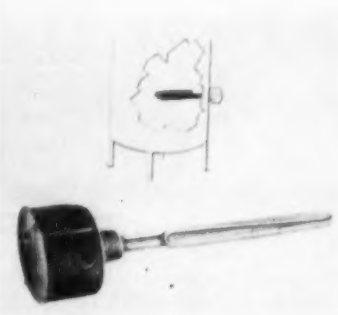
New Package Boiler Plant for Light Loads

When completely assembled, this 15 hp. scotch-marine steam boiler is termed ready for immediate operation after electricity, steam, water, fuel, and stack connections are made.

New model is available for burning either gas, oil, or gas and light oil. All necessary wiring is complete and equipment includes burners, blower, combustion safeguards, and all required valve and control components.

Design and construction equals or exceeds all latest requirements of the ASME Code and "Code of Ethics" of the Industrial Gas Equipment Division of GAMA. Over-all dimensions are: length 160 in., width 44 in., height 61 in.—*Eclipse Fuel Engineering Co., 1002 Buchanan St., Rockford, Ill.*

Circle 129B on Reader Service Card

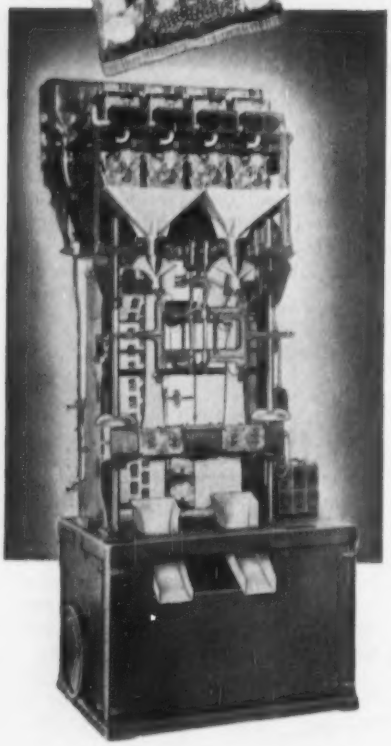


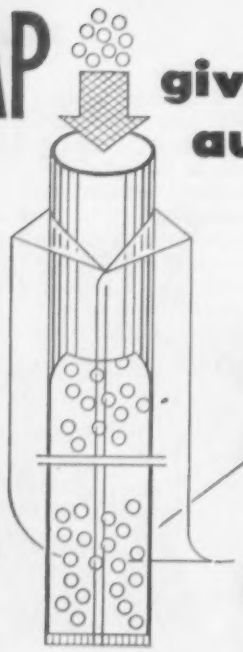
This Immersion Heater Has Built-In Control

A thermostatic control unit and the Corox heating element have been combined in a one-piece immersion heater. An integral part of the new heater, the control unit, eliminates necessity for a separately mounted and wired temperature regulating device.

New immersion unit is designed to convert any domestic water tank up to 110 gal. capacity to automatic electric

TRANSWRAP gives you completely automatic packaging





MEASURES THE PRODUCT

FORMS, FILLS AND SEALS THE PACKAGE

REDUCES COSTS

ADDS SALES APPEAL

A product in a Transwrap package is a top-flight item for self-service and counter display merchandising. Made from transparent wrapping material, the package gives shoppers a tempting pre-sale look at your product. Colorful printing effectively puts across your sales message. And the package is *hermetically sealed*—keeps the contents factory-fresh.

Packaging with a Transwrap machine is a remarkably simple and economical operation. That's because Transwrap is a one-unit, completely-automatic packaging plant. It accurately measures your product by volume, weight or count...forms a pillow-type or fin-seal package from material in roll form...then fills and seals it. You can make the package as large as 9½″ x 14″ or as small as ¾″ x 1½″. Uses Cellophane, Pliofilm, Vinyl, Saran, Polyethylene, foil or heat-seal coated papers, and registers the printed design. Can automatically imprint a sales message in several colors. One operator can supervise up to three Transwrap machines.

Write for complete information

PACKAGE MACHINERY COMPANY
SPRINGFIELD—MASSACHUSETTS

NEW YORK PHILADELPHIA BOSTON CLEVELAND CHICAGO ATLANTA DALLAS
DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

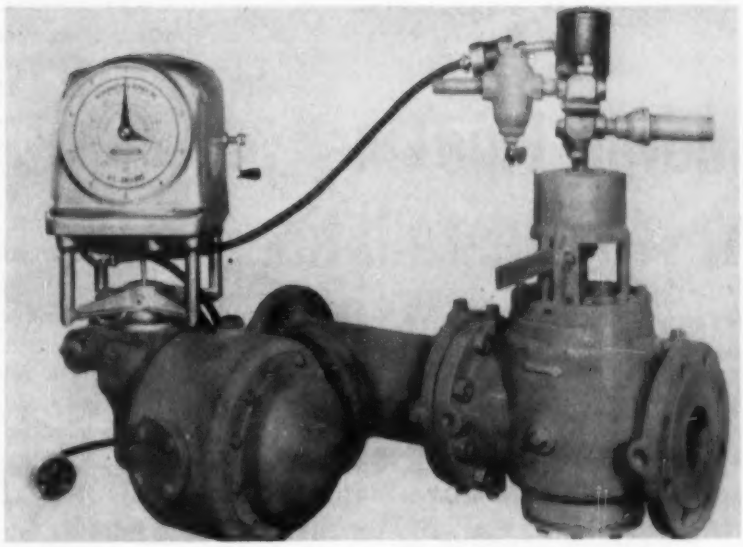
heating. Thermostat may be adjusted to maintain constant water temperatures in 120-to-180 F. range.

To install, heater is merely screwed into tank through threaded 1 in. pipe opening in tank wall and proper wiring connections made. It is not necessary to move tank.

Unit is available in power ratings from 750 to 2,500w. for either 118 or 236v. applications. Heaters made in steel tubing are also available with similar ratings for oil heating applications

In addition to water tanks, heaters are applicable to laboratory, dairy, and other equipment units. — *Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30.*

Circle 129C on Reader Service Card



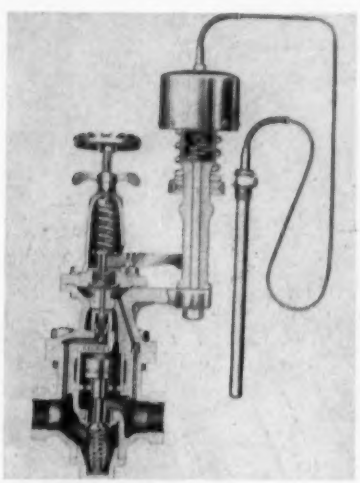
Automatically Meters Light, Heavy Liquids

Automation economy may be applied to batch handling of light or heavy liquids with use of this steam-jacketed Fluidometer system. Unit consists of 3-in line, a measuring element, motor-operated control register, and solenoid valve.

To operate, a control dial is set to the amount of liquid desired. Then, pushing a "start" button opens the valve allowing liquid to pass through the meter. Latter's drive shaft is directly coupled to the control and turns the dial hands to the zero point.

At zero, controlling element automatically closes the valve and returns the hands to the previous setting. If desired, starting push button can be replaced by a timing device. Unit requires no adjustment other than a change of setting, when amount of liquid passed through is changed.— *Hetherington & Berner, Inc., Indianapolis.*

Circle 131B on Reader Service Card



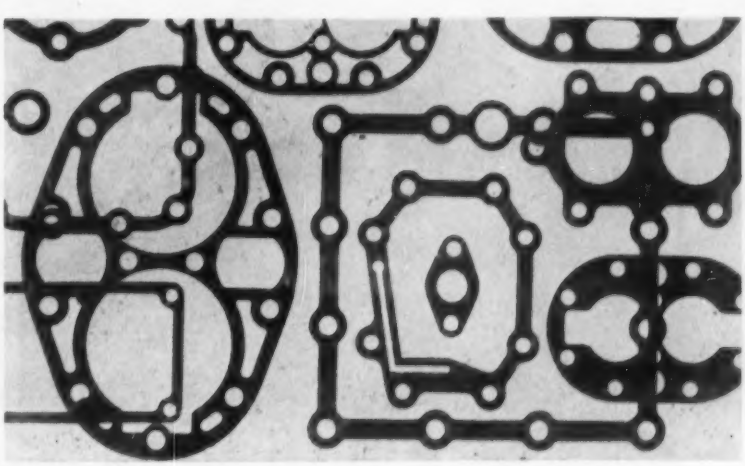
New Pressure Regulator Has Rapid Modulation

Precise temperature control is the aim of this new pressure-temperature regulator. Known as Type PTM, its rate of modulation is adjustable for a wide choice of control, but a minimum pressure differential of 10 lb. is needed to operate the valve.

Thermostatic unit increases or decreases steam pressure in response to temperature variations. Pressure change is smooth and rapid between initial setting and zero, thereby preventing overrun.

Regulator body is bronze or semi-steel. Pilot valve, main valve, and seat are of stainless steel and all wearing parts are renewable. Available in six temperature ranges, sizes are ¼-2 in. with screwed ends and 2½-6 in. with flanged ends.—*O. C. Keckley 400 W. Madison St., Chicago 6.*

Circle 131A on Reader Service Card



Gaskets For Sealing Against Refrigerant

Of interest to refrigeration men is a new compressed asbestos sheet packing for head gaskets on refrigeration compressors. Material seals effectively against Freon-22.

Known as R/M No. R-54, new sheet is developed solely for air-conditioning and refrigeration use. An all-purpose sheet, it has proved effective in sealing against all other Freons as

Zips Bulk Materials Into a "Moving Pipe Line" to Prevent Degradation, Contamination, Dust

S-A "ZIPPER" CONVEYOR-ELEVATORS

for sealed handling of BULK FOOD, CHEMICALS, GRAIN

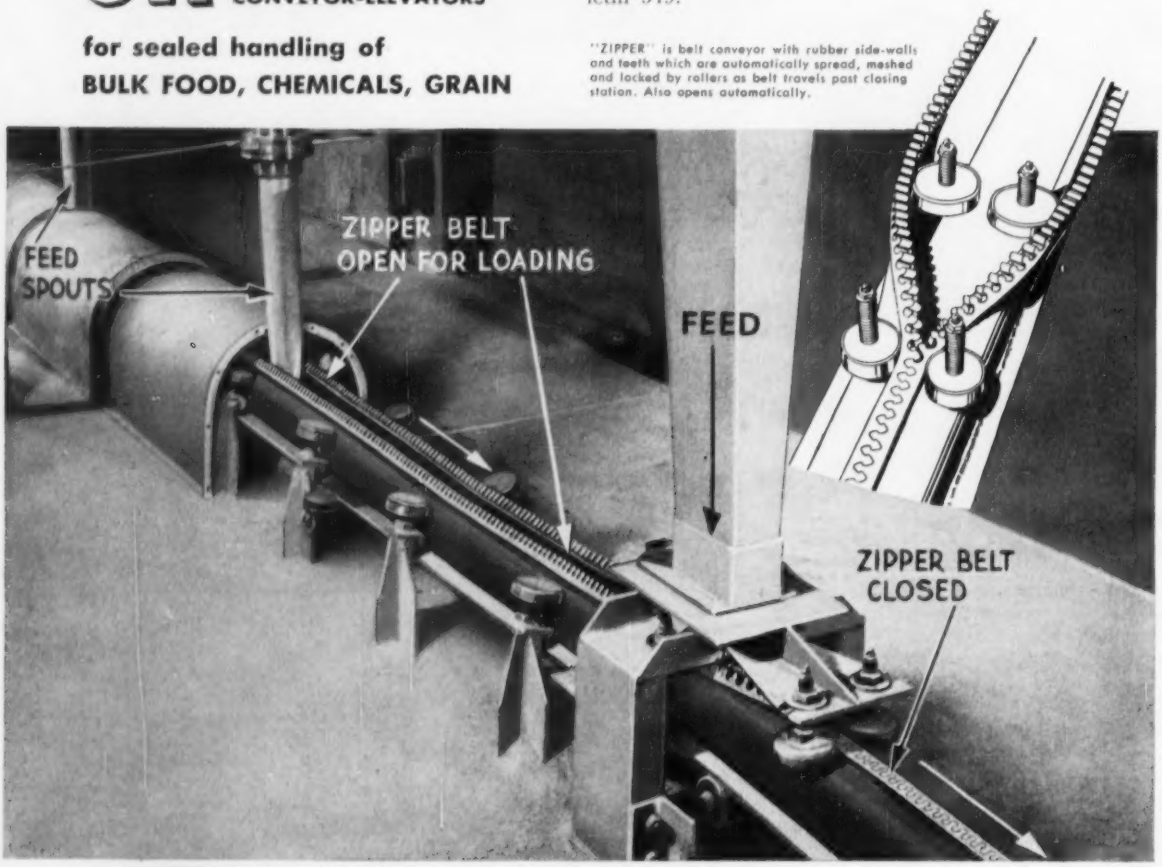
THE S-A "ZIPPER" Conveyor-Elevator seals bulk materials into a rubber "tube" that moves with the load. Conveys up, down or horizontally — in one or more planes — without crushing or packing granular, flaky, pulverized or lumpy materials. There's no agitation, no segregation, no abrasion against conveyor sides, no pressure exerted on the material to move it. The load is fully enclosed — there's no chance for spillage — dust is sealed in, contamination sealed out.

Complete Discharge

"ZIPPER" belt opens for loading and discharge. There are no pockets in which material can collect. "ZIPPERS" are equally suitable for long or short distance conveying and elevating in minimum space and with simple support. Power requirements are usually less than for conventional conveyors handling similar loads.

For more facts and typical arrangements, write for Bulletin 349.

"ZIPPER" is belt conveyor with rubber side-walls and teeth which are automatically spread, meshed and locked by rollers as belt travels past closing station. Also opens automatically.



STEPHENS-ADAMSON MFG. CO.

6 Ridgeway Avenue, Aurora, Illinois • Los Angeles, Calif. • Belleville, Ontario

Engineering Division
Specialists in the design and manufacture of all types of bulk materials conveying systems.

Standard Products Division
A complete line of conveyor accessories including centrifugal loaders—car pullers—bin level controls—etc.

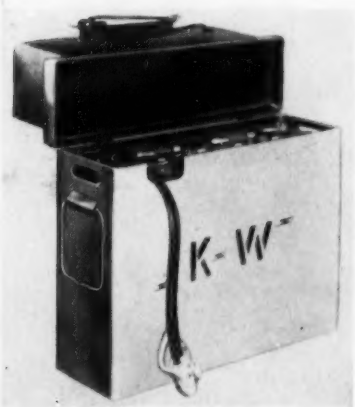
Sealmaster Division
A complete line of industrial ball bearing units available in both standard and special housings.

well as against 22. Material has been thoroughly tested on equipment installed in maker's laboratory and tests have been confirmed by application equipment using Freon-22. It meets A.S.T.M. 1170-G-1123 and A.M.S. 3231 requirements.

Binder is a new type of Neoprene which has been specially extended. Sheet is 70 to 75% asbestos. Special ingredients and a change in sheeting techniques account for ability of packing to seal against all Freons.

Neoprene binder was selected because it swells when in contact with refrigeration oil in Freon. This swelling assures a tight seat on flange and fills all spaces, thus preventing leaks past gasket as well as through it.—*Raybestos-Manhattan, Manheim, Pa.*

Circle 131C on Reader Service Card



Battery Incorporates Own Charger Unit

Users of "Walkie" type powered lift trucks will find this replacement battery of great advantage. Unit has a permanently mounted charger. Battery remains on truck and can be given a boost whenever truck is not in operation. It can be charged by plugging into any 110v., 60 cycle outlet. Charger can be left on without damage to battery, and routine charging can be done overnight, with no loss in truck use, or need for substitute battery. It is not necessary to disconnect battery from truck since charger is permanently connected to terminals.

Another feature is fact that top tilts back with charger for easy access to battery for adding water. This charger-equipped power unit is identified as "Charger 6 SPC-11" 275 A. H.—*K-W Battery Co., 3608 W. Howard St., Skokie, Ill.*

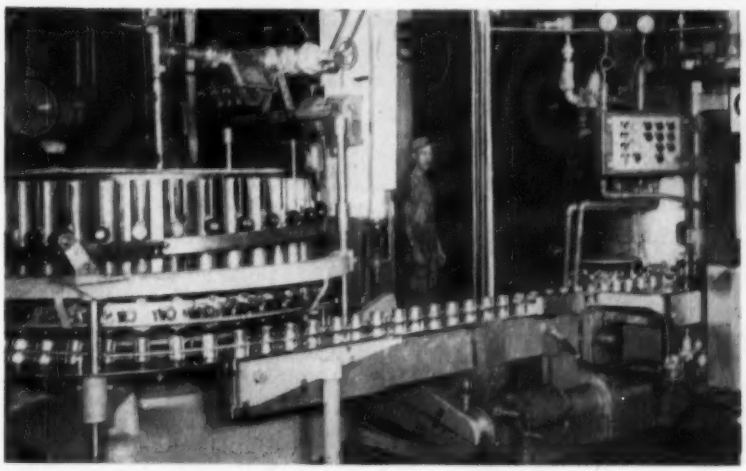
Circle 133A on Reader Service Card

Delivery Trucks Powered by Electric Batteries

Of interest to beverage, bakery and dairy operators is this new line of electric delivery trucks. Their use is claimed to cut urban delivery costs more than 25%.

According to designer, new trucks are powered by Exide Ironclad batteries which are charged overnight. Supplier of batteries, estimates charging cost at approximately 33 cents a shift per truck on delivery routes up to 35 miles. Electric trucks require little maintenance. Insurance rates are low because of safety factor. Useful life is estimated at 20 yr. Absence of fumes, vibration and noise also is among advantages claimed. Lightweight trucks carry a payload of 2,000 to 2,500 lb. at speeds termed more than adequate for today's urban driving. Battery power assures long life for all wearing parts, including standard pneumatic tires. Front wheel drive with battery mounted over front wheels provides maximum traction and unobstructed loading space in rear.—*Cleveland Vehicle Co., Cleveland.*

Circle 133B on Reader Service Card



Closes Cans At 1,000 Per Min. Rate

This new, high-speed, precision closing machine is capable of operating at a rate of 1,000 cans per min. In illustration above, cans are being fed into machine (right) from Pfaudler 35 rotary filling machine (left).

New machine, result of two years of experimental work, incorporates use of a hydraulic drive to control the rapid accelerations and decelerations that result from this high speed.

To assure continuous delivery of can covers at maximum speed, dual cover-feeds are employed. They are

IS COMPLEX LUBRICATION

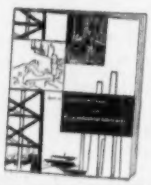
Tying Up Man Hours?

Cut costs with Pure's "Simplify and Save" plan

THE PURE OIL COMPANY, U.S.A. — PURE

Are old lubrication methods tying up manhours?

In most plants no more than six *Pure Multipurpose Lubricants* are needed to do the work that normally requires dozens of specialized lubricants. Speeds application. Reduces inventory. Minimizes misapplication. Simplifies lubrication and stock control. Streamlines purchasing. Why not phone your nearest Pure Oil office and see how this simplified plan can cut costs for you. Reverse the charges—and call now.



FREE BOOKLET tells you "How to Simplify and Save." Write The Pure Oil Company, 35 E. Wacker Drive, Chicago 1, Illinois.

Be sure with Pure **PURE MULTIPURPOSE LUBRICANTS**

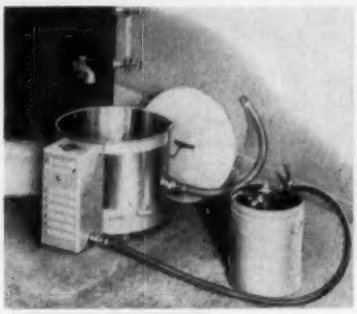
Sales offices located in more than 500 cities in Pure's marketing area

actuated by cans passing through a magnetic field. This marks first time that such an installation, developed by maker, has been used to actuate dual-cover feeds.

Machine is now in operation at Leamington, Ont. plant of H. J. Heinz of Canada, Ltd. and is not to be considered an experimental unit in any way. All of its principles have been tried and proven over many years, states maker's engineers who have no doubt about its suitability and adaptability to high-speed, volume production.

Durability is assured by use of materials of construction of the latest type developed in metals industry. Machine will meet all requirements for high-speed closing of liquid and semi-solid products. — *Continental Can Co., 100 E. 42nd St., New York City 17.*

Circle 133C on Reader Service Card



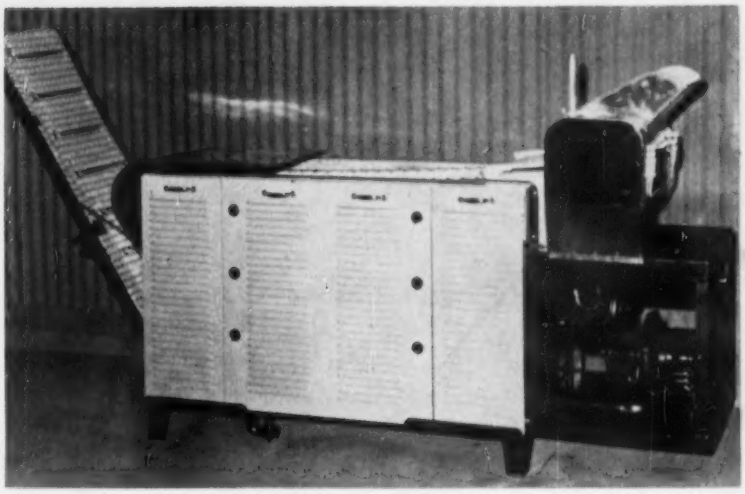
Vacuum Unit Filters Open-Kettle Lard

This new vacuum filter is designed to give lard, rendered with open-kettle equipment, the smooth and white texture of the pressure rendered type. It filters a 75-gal. batch in 20 min., removes fine particles of cracklings, and bleaches the lard.

A vacuum pump pulls heated lard or cooking fat through a filter bed (1 lb. filter-aid per 75 gal. lard) and a disposable filter paper. Product is delivered directly to its container through a flexible hose.

Unit consists of a seamless, one-piece pressed steel tank, 18 in. high and 22 in. dia. Enclosed in a housing mounted on the side of the tank is a ¼-hp. motor and pump, complete with heavy-duty neoprene hoses and fittings. Filter operates on 110/220 v. a.c., occupies only 5 sq. ft. of floor space, and may be cleaned in 5 min.— *Koch Supplies, 2520 Holmes St., Kansas City 8, Mo.*

Circle 135A on Reader Service Card



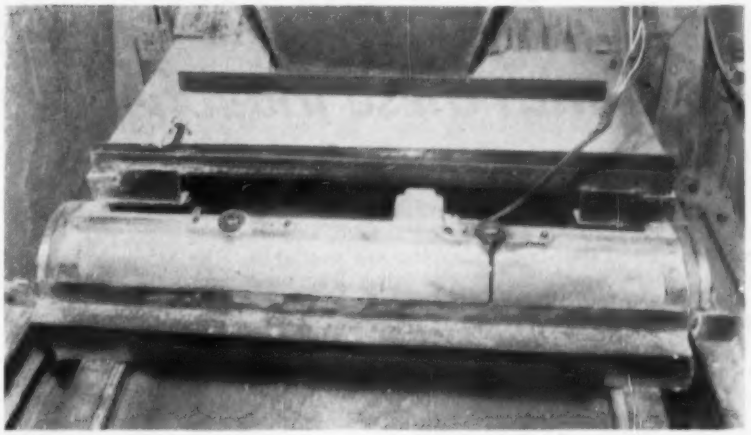
Automatic Tortilla Oven Has High Output

This tortilla oven, claimed to be the first completely automatic unit, produces 220 to 300 dozen tortillas per hour. All chains and gears are shielded by stainless steel covers, assuring operator maximum safety and reducing clean-up time. Full insulation speeds cooking time and eliminates operator heat fatigue. Lubrication is only required maintenance.

In machine head where dough is rolled into a sheet of masa, there are two rollers which contain a stripping wire. This wire releases dough from back roller. As sheet of dough sticks to front roller, a rotor-type cutter underneath roller cuts in same manner as a cookie cutter. As tortilla progresses toward front of roller, stripping wire forces cut tortilla onto cutter discharge belt which transfers it to oven. The tortilla cooks once on one side and twice on other side in 35 sec.

Maintained oven temperature is about 550 F. Fuel consumption is about 200 cu. ft. of natural gas per hr. A ½ hp. motor is used. Smaller model (120 to 160 doz. per hr.) is available. —*J. C. Ford Mfg. Co., 1594 Monterey Pass Rd., Monterey Park, Calif.*

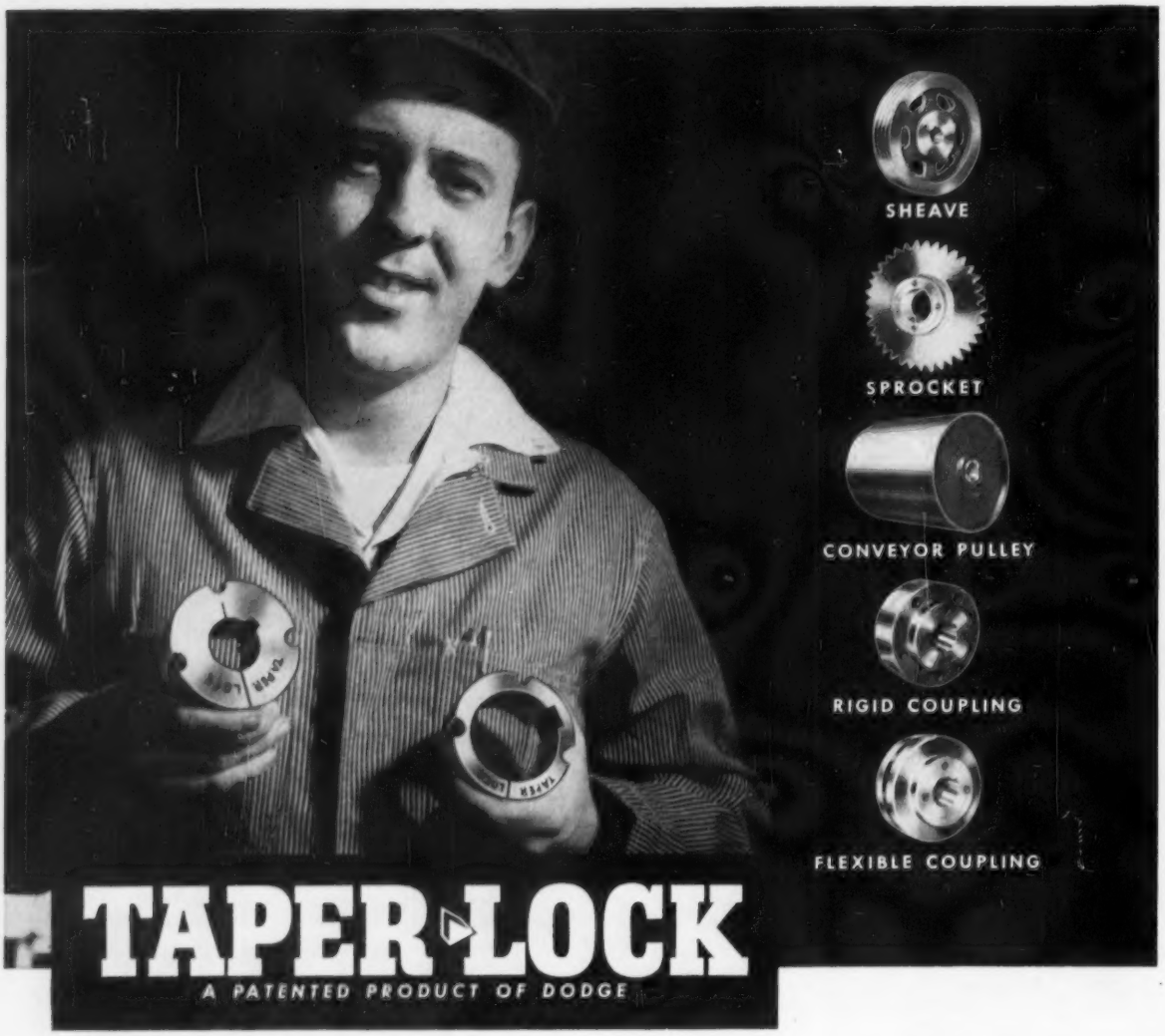
Circle 135B on Reader Service Card



Screen's Capacity Upped, Weight Lowered

Increased screening capacity and reduced weight, 30 and 39% respectively, are claimed for eccentric motor screens through use of an aluminum alloy. Eccentric units are used for screening of fine materials either wet or dry. They are available in a screening range from 2 to 425 mesh.

Long tubular motor housing was formerly made of steel and weighed



TAPER-LOCK

A PATENTED PRODUCT OF DODGE

"Brother...you sure can save with these interchangeable bushings!"

With a few Taper-Lock bushings you can make quicker changes and cut down-time on production machines—because Taper-Lock bushings are *interchangeable*. Shift from a Dodge sprocket to a Dodge sheave, and use the same bushing! Taper-Lock bushings are available in a range of sizes which makes changing from one size shaft to another equally easy and quick.

Mount 'em all with Taper-Lock bushings—your sheaves, sprockets, couplings, conveyor pulleys. They slip on the shaft quickly—hold with the firmness of a shrunk-on fit—come off easily without shock to bearings or machinery. Standardize, economize with Taper-Lock.

DODGE MANUFACTURING CORPORATION, 2800 Union St., Mishawaka, Ind.

THERE'S ONLY ONE TAPER-LOCK, THE BUSHING THAT MOUNTS FLUSH!

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

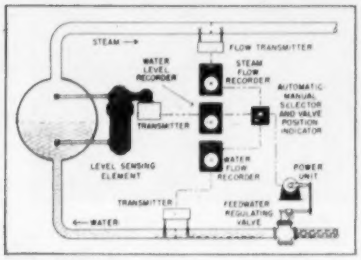
DODGE

of Mishawaka, Ind.

235 lb. By making this housing of 40-E aluminum alloy, weight has reduced to 145 lb. This weight reduction permitted higher amplitudes of vibration, thereby producing 30% more vigorous screen action.

Many other structural and performance advantages were gained by the use of aluminum. Its strength and shock resistance made the alloy particularly suitable for this type of equipment. Since aluminum is an excellent conductor of heat, it was found that its use allowed the motor to run cooler by transmitting the heat over entire housing surface. It eliminated localized heat concentrations. Use of alloy eliminated necessity of finishing or painting. Natural color casting remains unchanged because of its resistance to action of corrosive atmospheres and liquids.—*Frontier Bronze Corp., 4870 Packard Road, Niagara Falls, N. Y.*

Circle 135C on Reader Service Card



New Electronic Controls Ease Boiler Operation

This 3-element feedwater control system is a recent electronic development that reportedly combines speed of transmission with accuracy of control. Also available are single- or double-element systems to meet the requirements of small and medium boilers under normal or severe operating conditions.

New unit incorporates level sensing, steam flow, and water flow measurement. Operation is independent of normal variation in voltage and frequency, and existing instruments may be used with these controls, which accommodate pressures up to 2,500 psig.

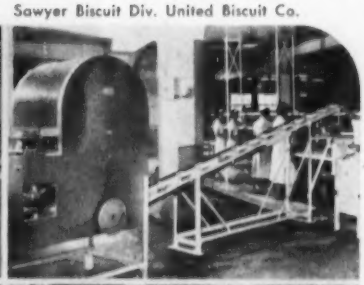
Other features are: Positive valve drive (cannot freeze); operative even on cold boilers; mercury-less measuring and transmission for flow and level; direct level measurement; electronic null balance remote operation; independent adjustments for effects of steam flow, water flow, water level; and no blow-down required.—*Hays Corp., Michigan City, Ind.*

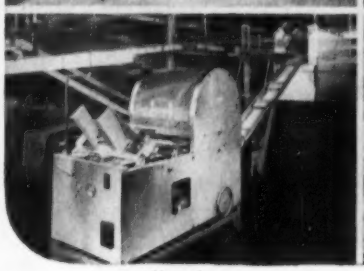
Circle 137A on Reader Service Card

QUICK WAY TO CUT CARTON COSTS

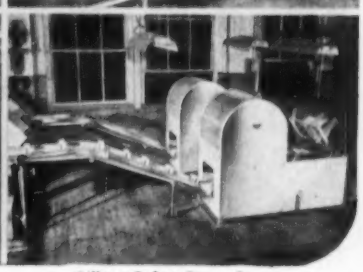
Cracker Jack Co.

Sawyer Biscuit Div. United Biscuit Co.





Mars, Inc.



Gillette Safety Razor Co.

Make 'em in your own plant

Manufacturers in many fields are installing our Model PA carton former because of the substantial savings it makes. Often pays for itself in *less than a year through savings on material costs alone.*

With this machine, you simply buy die-cut cardboard blanks—far cheaper than finished or hand-set-up cartons. The machine forms the blanks and glues them at speeds up to 100 a minute. Requires so little supervision that in some plants one person takes care of several PA machines. It is adjustable for different sizes and delivers the cartons right-side-up so they can be conveyed automatically to filling stations.

Makes many types of cartons

It is likely that the cartons you are now using, with slight modifications, can be replaced by economical, attractive and sturdy PA-made cartons. We'll be glad to submit samples for your approval.

Literature on request

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS

NEW YORK PHILADELPHIA BOSTON CLEVELAND CHICAGO MINNEAPOLIS ATLANTA
DALLAS DENVER LOS ANGELES SAN FRANCISCO SEATTLE TORONTO MEXICO, D.F.

For more information, use coupon on last page.

USE STRAINERS?
USE YARWAYS

■ Use pipeline strainers in your plant? If so, you've plenty of reasons for using YARWAY Fine Screen Strainers.

Some of the reasons are these:

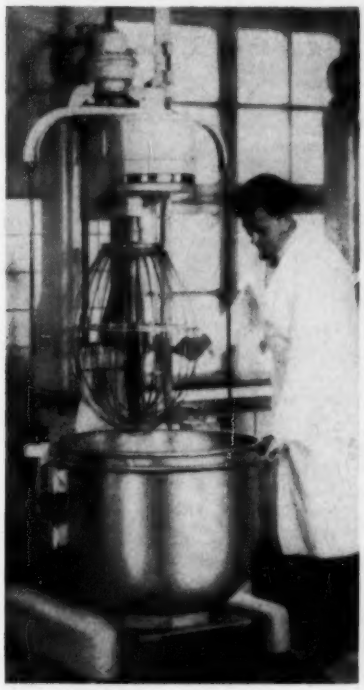
- Available in *iron* or *steel* with rust-resistant finish, also *bronze, stainless steel* and *aluminum.*
- Dutch weave Monel woven wire screens have high mechanical strength, extra fine straining service. Also perforated bronze, monel or stainless steel.
- Easy to remove screen caps with straight threads to assure proper alignment of screen.
- 10 standard sizes from ¼" to 3". Larger sizes to order. Also flanged and socket-weld connections.
- Stocked and sold by over 300 industrial distributors in the United States, Canada and abroad.

Write today for YARWAY Strainer Bulletin S-204, and name of nearest distributor.

YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.

SCREEN EASILY REMOVED
Unscrew cap and screen comes out with it. When replacing, put screen in cap, then screw cap into body. Straight threads assure correct alignment, no screen distortion. Cap is tapped for pipe plug or blow-off line.

YARWAY FINE SCREEN STRAINERS



Sturdy Food Mixer

Extra durability in hard continual service is reported for this new Swedish 200-qt. unit. Design features include tempered gear wheels and large ball bearings.

Known as SV 200, its high mixing efficiency is attributed to a planet whipper that revolves about the bowl axis as it rotates. Vertical motion of whipper is controlled by a separate overhead motor that automatically stops it at the high or low position.

Lowering the whipper locks the stainless steel mixing bowl in working position, while raising it frees the vessel for easy removal from the machine. And bowl is roller mounted to simplify handling.

Standard equipment includes a stainless steel splash guard, two 200-qt. bowls, and two whippers.—*Blomqvists Verkstads AB, Sodertalje, Sweden.*

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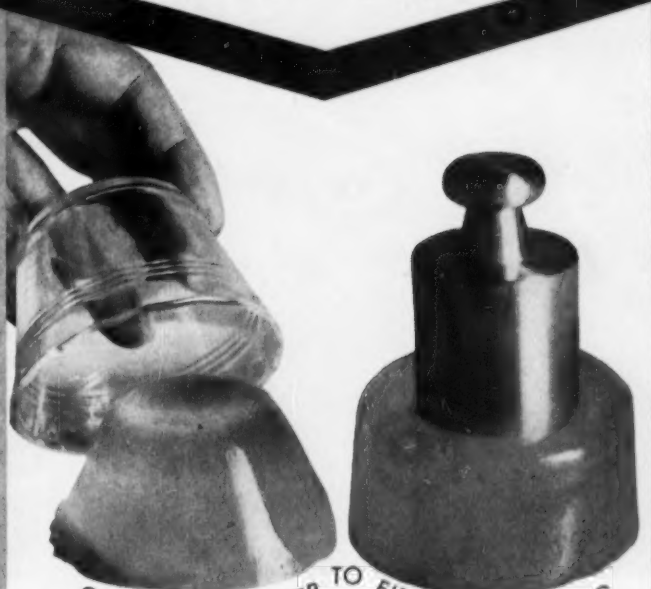
Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

SOMETHING NEW!

ALGIN WATER GELS



A wide variety of useful gels can be formed from versatile algin. Algin gels are clear, do not melt at room temperature, and can be varied to requirements from tender dessert types to firm strong types.

Check these characteristics and advantages of algin water gels:

1. Clear, non-melting. **2.** Tender and soft to firm and strong. **3.** Acid or alkaline. **4.** With or without additional solids. **5.** Control setting time. **6.** Sets at room or refrigerator temperature. **7.** Made with hot or cold water or milk.

Algin gels are now being widely used in the dessert, candy, bakery, dental, pharmaceutical and industrial fields. Perhaps an algin gel may be the answer to one of your problems.

KELCO COMPANY 31 NASSAU STREET, NEW YORK 5, N. Y.
20 N. WACKER DRIVE, CHICAGO 6, ILL. 530 WEST SIXTH STREET, LOS ANGELES 14, CALIF.
CABLE ADDRESS: KELCOALGIN — NEW YORK

KELCO COMPANY
Dept. R, 31 Nassau Street, New York 5, N. Y.
Please send me your bulletin describing the properties, preparation and use of gels made from Kelco algin products.

Name .....
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Company .....
Address .....
City ..... State .....

STURTEVANT MICRONIZER* GRINDING MACHINE

Grinds Materials To Any Micron Size Specification

NOW AVAILABLE FOR OUTRIGHT SALE

24" Size
Capacities 1000 to 1200 lbs. per hour

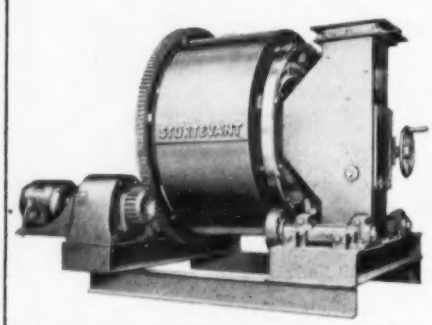
The Sturtevant *Micronizers* are fluid jet grinding machines designed to reduce solid materials to particle sizes in the micron range.

Using compressible fluids, air or steam, as the source of energy, *Micronizers* produce pulverized materials to specifications unobtainable by other mechanical equipment such as ball, pebble or hammer mills.

The variety of materials processed is large and includes both nonmetallic and metallic minerals and ores, metals, pigments, insecticides, fungicides, pharmaceuticals, plastics, dyes and numerous other organic and inorganic products.

It is quickly and easily cleaned on changes of formulation with minimum loss of material. Simple to install and operate. It is available as a machine alone . . . or as a complete grouping with premixing, grinding and bagging equipment. Write for complete information, today.

*Micronizer is the Registered Trademark of the Sturtevant Mill Company.

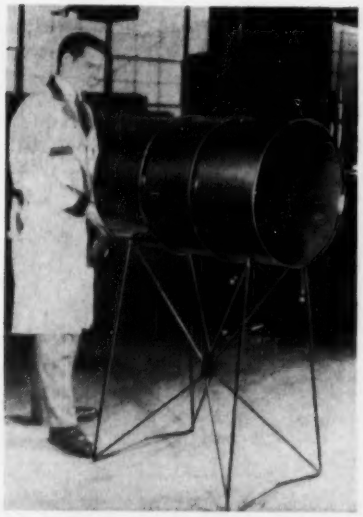


Sturtevant Dry-Batch Mixer for mixing materials into a homogeneous mass. 5 models: ¼ to 2 tons.

STURTEVANT MILL COMPANY

106 CLAYTON STREET, BOSTON 22, MASS.

Designers and Manufacturers of CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS
MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS



New Drum Storage Rack Is Easily Collapsible

Designed to raise drum spouts to easy pouring height or for storage, this lightweight storage rack is of all-steel welded construction.

It supports a fully filled 55-gal. drum and wide legs assure stability. Unit is knocked down by unfastening a single bolt.—*Star Welding Co., 1054 E. 134th St., Cleveland 10.*

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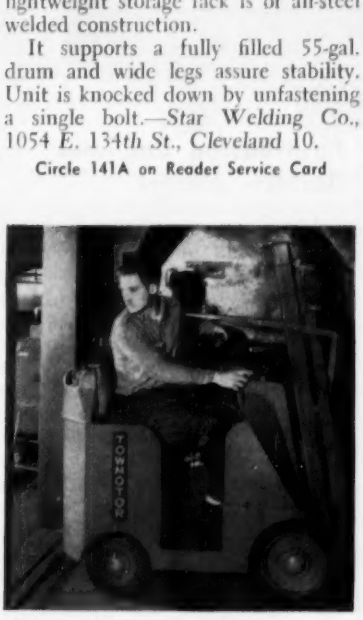
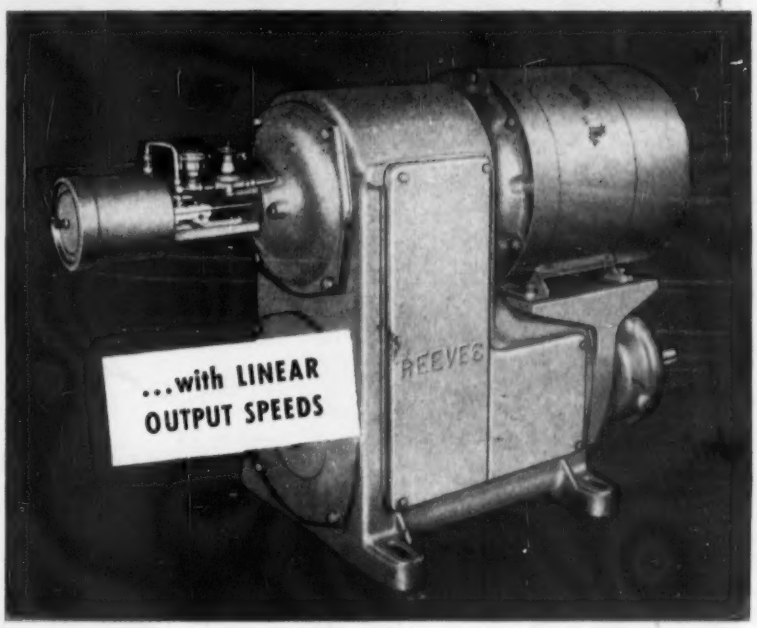


Lift Truck Equipped With Folding Forks

Compactness, lightweight and ability to perform in cramped quarters marks this LT35 fork lift truck. Unit is equipped with special modified forks that makes it possible for it to fit into very small places. Forks fold back over truck permitting it to be lifted to other floors in a small elevator that could not ordinarily carry a fork lift truck.

New *Automatic Speed* Control for Continuous Processing



REEVES

Auto-Pneumatic Control

● Now with the REEVES Vari-Speed Motodrive equipped with the new sensitive Auto-Pneumatic control, you can automatically control continuous processes involving the regulation of heat, liquid level, pressure, temperature, flow, and many other variables. Positive, direct connection from the pneumatic instrument to the Auto-Pneumatic control assures accurate and sensitive speed regulation.

Exclusive REEVES cam design provides linear output speeds so necessary for delicate proportioning processes . . . maintains the greatest accuracy while regulating or maintaining any speed throughout the range of the Motodrive.

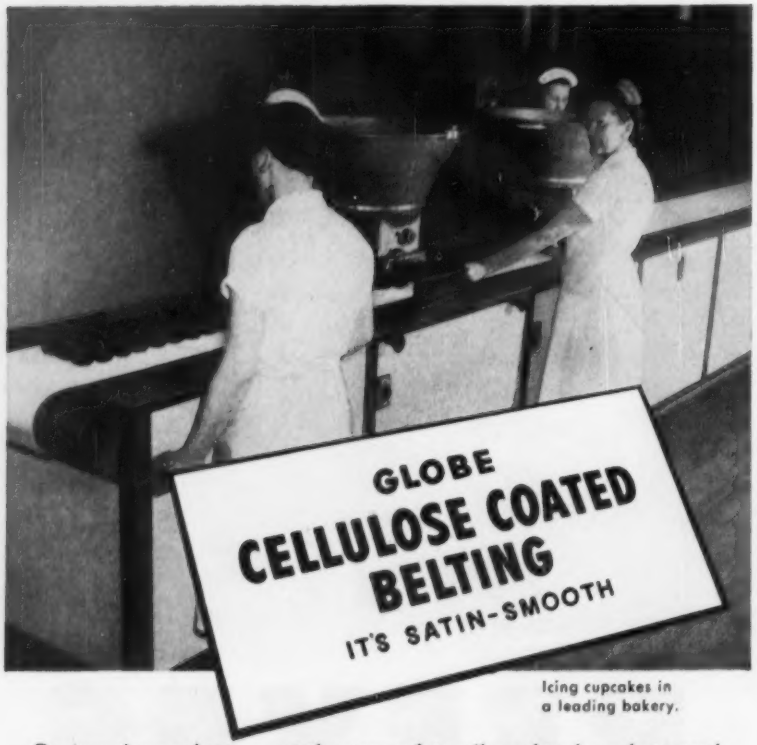
REEVES Auto-Pneumatic Control assures maximum efficiency and economy in industrial processes . . . means outstanding savings for you in material, fuel and labor costs plus continuous uniformity of your product or process. Write today for complete information.

REEVES PULLEY COMPANY · COLUMBUS, INDIANA

Send today for
BULLETIN FE 136-G

For more information, use coupon on last page.

fats and oils can't penetrate it! tacky foods won't cling to it!



Icing cupcakes in a leading bakery.

Convey the product . . . not the excess fats, oils and tacky substances! That's sound advice for any bakery or candy plant demanding product purity . . . freedom from contaminating flavors and odors from previous batches.

. . . and that's advice that can be carried out easily, *with consistent success*, if you convey your foods with Globe Cellulose Coated, Solid Woven Cotton Belting.

Its satin-smooth finish cannot be penetrated by fats or oils from excessively greasy products, making it ideally suited to doughnut-making machines. All grease remains on the surface, to be quickly and thoroughly washed away with soap and water. *The only completely sanitary way!*

Nor will tacky particles cling to Globe Cellulose coating, as they do to the rough, uneven surfaces of other belts. What better reason for such widespread use on cookie cutting machines and in candy plants?

Waterproof and heat resistant, possessing all the well known strength and wearing qualities of its solid woven cotton carcass, Globe Cellulose Coated Belting is the only satisfactory solution to conveying problems in many types of food industries, including packing plants.

Available in clear amber or opaque white, coated on the carrying side only or pulley side, too, it is manufactured in widths from 1" to 60" and in all standard plies.

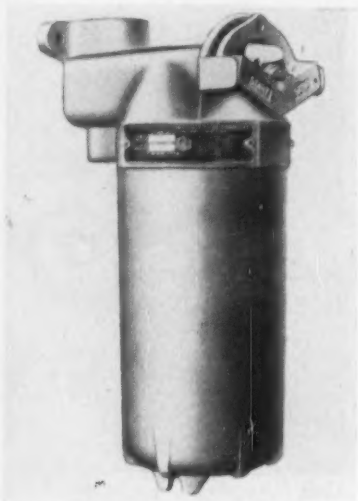
Write Dept. E for free samples, literatur and the name of your local distributor.

GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET • BUFFALO 6, NEW YORK
KNOWN FOR QUALITY THE WORLD OVER

Equipment & Supplies

Actually forks are standard that are fastened only at top and are free at bottom. This arrangement, together with special notches in carriage, permits operator to fold back forks quickly and easily when required.—*Towmotor Corp., 1226 E. 152nd St., Cleveland 10.*

Circle 141B on Reader Service Card



Push-Button Condulet Restarts Motors

Whenever motor starters disconnect because of low voltage or voltage failure, interruptions occur in electrical service that reduce productivity and impair efficient processing. To minimize such disconnections, this new time delay push-button station condulet (type OFC) restarts motors automatically. Device is set, to restart motors within time limits of 2, 4, or 6 sec.

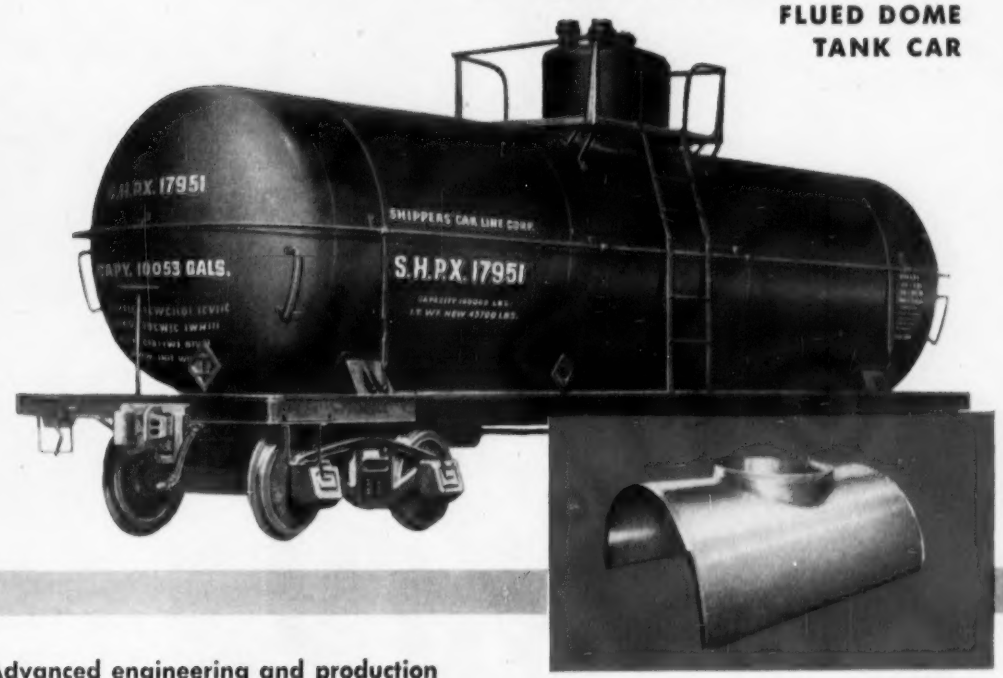
Designed for use at Class I, Group D; Class II, Groups E, F, and G; or Class III hazardous locations, new explosion-proof and dust-tight device is similar in outward appearance to standard condulets. However, its dome-shaped cover is 9½ in. deep, much longer than the standard.

Interior electrical equipment of new device includes a push-button switch, capacitor, rectifier, sensitive relay and control relay. In addition, a transformer for voltages exceeding 110 is supplied, with capacities of 220, 440 and 550v. All internal wiring is supplied, including two terminal blocks; one for field connections and another marked for 2, 4 and 6 sec. By positioning one wire at any one of these terminals a time delay of 2, 4, or 6 sec.

New concept in tank cars

acf BUILT **DURADOME**

FLUED DOME TANK CAR



Advanced engineering and production know-how make this truly modern tank car available at *no extra cost*.

Top center section, showing flued dome base

- A million-dollar press actually *flues* the dome base out of the heavy center section—providing greater strength and a smooth interior for easier cleaning . . . better application of lining.
- Superior *pressure-type* tank construction (complete ring sections) means heavier steel *all* the way around for greater durability.
- *Standardized* all-welded underframe provides flexibility of use with tanks of all standard types and capacities . . . more economical maintenance.
- *All-welded* insulation jacket (when insulation is required). Streamlined . . . more weatherproof . . . easier to keep clean . . . needs less maintenance.

The DURADOME car is available for lease or sale through . . .

SHIPPERS' SHPX CAR LINE

SHIPPERS' CAR LINE CORPORATION

30 Church Street, New York 7, N. Y.

A subsidiary of acf INDUSTRIES Incorporated

CHICAGO, ILL. • HOUSTON, TEX. • SAN FRANCISCO, CAL. • MILTON, PA. • EAST ST. LOUIS, ILL. • SMACKOVER, ARK. • TULSA, OKLA. • NORTH KANSAS CITY, MO.

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Satisfaction rests on the carton

Every working day of the year sees tens of thousands of Union Corrugated Shipping Containers deliver famous brands to food outlets all over the United States. Lever Brothers Company, New York, is one of the leading manufacturers who specify these dependable boxes. Follow the lead of hundreds of the country's biggest shippers and talk to the man from Union—soon.

TRADE MARK UNION
INTEGRATED PLANNING
INTEGRATED PRODUCTION

UNION BAG & PAPER CORPORATION

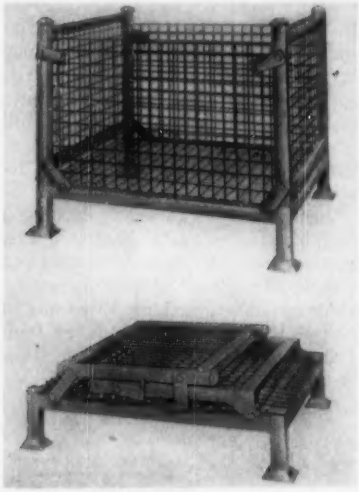
CORRUGATED CONTAINER DIVISION • Box Plants: Savannah, Ga., Trenton, N. J., Chicago, Ill.

Eastern Division Sales Offices: 1400 E. State St., Trenton 9, N. J. • Southern Division Sales Offices: P.O. Box 570, Savannah, Ga.
Western Division Sales Offices: 4545 West Palmer, Chicago 39, Ill. • Executive Offices: Woolworth Bldg., New York 7, N. Y.

is determined automatically by unit.

Body of device has vertical through-feed hubs for threaded conduit, one of which is equipped with a removable pipe plug for either dead-end or through-feed wiring. Also, a shaft with a threaded bearing provides efficient movement without excessive wear of station condulet's operating mechanism.—*Crouse-Hinds Co., Wolf and Seventh North Sts., Syracuse, N. Y.*

Circle 142A on Reader Service Card



All-Steel Folding Box For Heavier Loads

Economy in materials handling, with heavier loads, is now possible with this new all steel, folding Pyramid box, a heavy duty knock-down shipping container.

New shipper combines structural strength of steel tubular rack with desirable features of wire mesh container to make it a durable shipping and stacking unit. Its rugged construction, and capacity permits handling of large loads with fork trucks.

Nesting design permits tiering when loaded; and when empty, container folds down to a compact unit which also nests in an interlocking position to make a tier of eight.

Each folded unit stands 15¾ in. high while tier of eight totals 87½ in. Collapsible feature cuts costs of returns and reduces storage space while out of use. Container is offered in two standard sizes; 40 x 48 in. and 32 x 40 x 24 in. The X frame base provides entry from all sides and gives container utmost rigidity.—*Paltier Corp., 1701 Kentucky St., Michigan City, Ind.*

Circle 145A on Reader Service Card

"Measuring CORROSIVE LIQUIDS is no problem with NIAGARA STAINLESS STEEL METERS"

Whether you're measuring caustic soda, acids, molten sulphur or many other corrosive liquids, you want reliable measurement all the time. NIAGARA METERS — made of type 316 stainless steel—resist damage from a wide range of corrosive products. Maintenance is kept to the absolute minimum because of the unusual simplicity in construction of NIAGARA METERS.

If you process or use liquids of a corrosive nature, it will be to your advantage to investigate NIAGARA.

Send in the Data Request blank below today

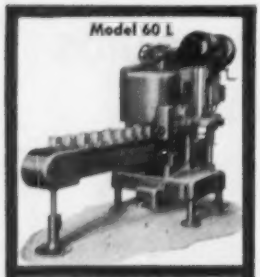
BUFFALO METER CO.
2910 MAIN STREET
BUFFALO, N.Y.

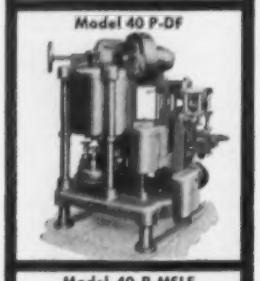
Gentlemen:

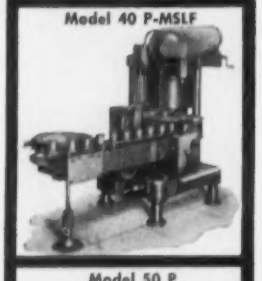
Please send me complete information on the use of economical NIAGARA METERS, based on the data below:

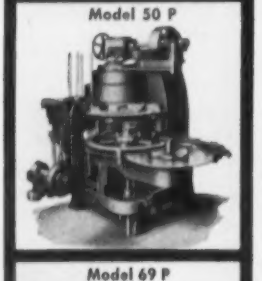
Liquid_____ Pressure_____ p.s.i.
Temp._____ F.
Flow rate _____ g.p.m.
Maximum batch_____ gals.
Name_____
Company_____
Address_____

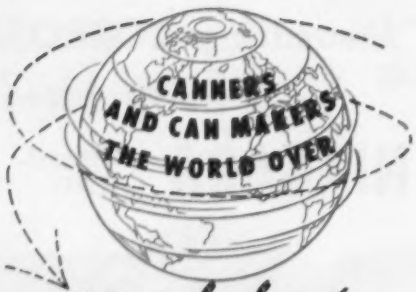
For more information, use coupon on last page.











are swinging to

ANGELUS
can closing machines

for lower investment, lower maintenance, higher production

Round can closing equipment has been an Angelus specialty for more than 40 years. Throughout these many years Angelus equipment has been developed to a high degree of efficiency, simplicity and ruggedness that gives you the ultimate in dependable low cost operation. This is why Angelus is the world's largest exporter and the nation's only manufacturer specializing in can closing machines. Angelus machines are in wide demand in areas where maintenance facilities and skilled operators are at a premium . . . where continuous production demands the utmost in dependable operation.

Angelus Automatic Seamers and their wide range of accessories meet can closing requirements for a multitude of products . . . from pop to petroleum, from tuna to tomatoes.

Angelus offers a variety of styles with capacities ranging from 30 to 400 cans per minute.

Write today –
for complete details on models and an Angelus Engineered Application Recommendation.

ANGELUS
Sanitary Can Machine Company
Cable Address "Angelmeco" Western Union Code
4900 Pacific Boulevard • Los Angeles 58, Calif.

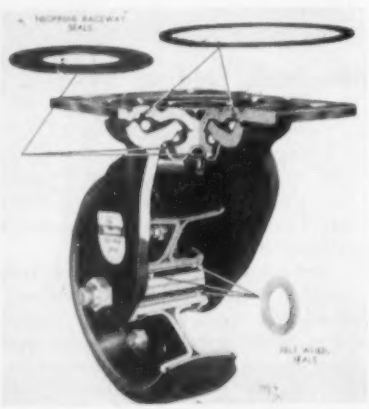
Equipment & Supplies

Versatile Indicating Millivoltmeter

High accuracy and short response time are reported for a new Model 580 indicating millivoltmeter, which may be used to measure temperature, pH, rotational speed, or power consumption. Unit's precision is 1% of full scale value, while minimum response time is less than 6 sec. for 99% response.

Instrument has a recently developed high-torque, jeweled millivoltmeter mechanism with Alnico V magnet and self-supporting coil. A neutralizing resistance compensates for variations in coil resistance due to ambient temperature changes.—*Bristol Co., Waterbury 20, Conn.*

Circle 196A on Reader Service Card



Raceways, Bearings Sealed On Industrial Casters

These new industrial casters are equipped with sealed raceways and wheel bearings that keep lubricants in and foreign materials out. Seals protect against moisture, steam, acids, grease, grit, chemicals and other destructive conditions, insuring longer caster life and reduced maintenance time and expense.

Load and thrust raceways of swivel casters are protected by long-wearing, resilient Neoprene seals reported to stand up under constant and heavy

get better performance

from processing to point-of-sale with

PFIZER ASCORBIC ACID or SODIUM ASCORBATE

Your cooked, cured, comminuted meats are *easier to produce*, easier to *sell* with Pfizer Ascorbic Acid or Sodium Ascorbate because:

❶ *Handling is easy* . . . just dissolve in water, add near the end of the chop.

❷ *Smokehouse time is cut* . . . up to a third or more, boosting your production.

❸ *Color retention is improved* . . . giving you meat products with increased sales appeal and longer shelf life.

❹ *Shrinkage is reduced* . . . because you get the best color in the least cure-time.

NEW USE! You can also give superior, more lasting color to pickled beef briskets, corned beef, etc. Just add Pfizer Ascorbic Acid or Sodium Ascorbate to the curing pickle. (M.I.B. Memo #205, 7/1/54)

CHAS. PFIZER & CO., INC.
CHEMICAL SALES DIVISION
630 Flushing Ave., Brooklyn 6, N. Y.
Branch Offices: Chicago, Ill.; San Francisco, Calif.; Vernon, Calif.; Atlanta, Ga.

Manufacturing Chemists for Over 100 Years Pfizer

Chas. Pfizer & Co., Inc., Chem. Sales Div. ME
630 Flushing Ave., Bklyn. 6, N. Y.

Please send your free technical bulletin and wall chart showing how to prepare and use Pfizer Ascorbic Acid and Sodium Ascorbate solutions.

NAME _____

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COMPANY _____

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CITY _____ ZONE _____ STATE _____

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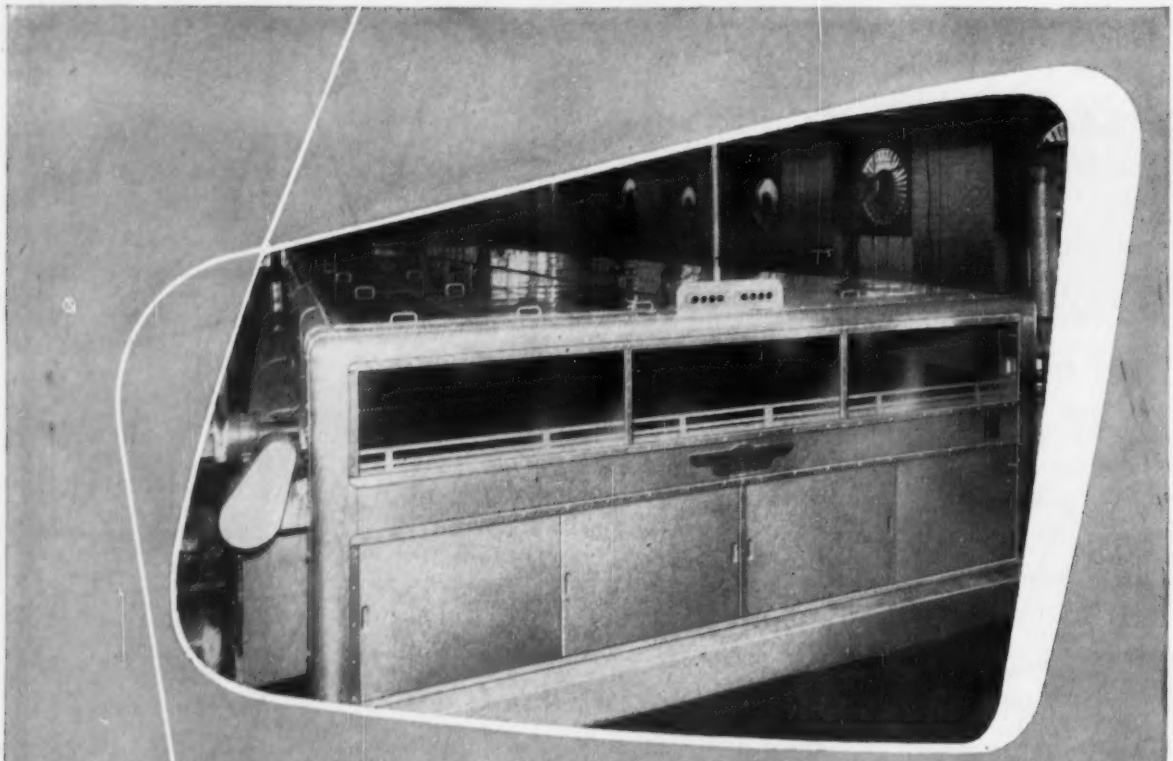


Processing Fanning's Bread and Butter Pickles

ONLY ...4 MONTHS-A-YEAR..

the B-W VORTEX Pasteurizer Proved PROFITABLE

For The Best Foods Inc.

When The Best Foods Inc., Norfolk, Va., expanded their plant facilities and increased the degree of mechanization, a B-W Vortex Pasteurizer was part of their new production plan. They found the following definite advantages of the Vortex made it a profitable investment:

- Compactness of the Vortex allowed increased expansion without additional building.
- Bottle pre-heating and better automatic control decreased breakage loss and did a more uniform pasteurizing job.
- Absence of steam vapors and heat made for better working conditions.

Mechanization of production facilities—of which the Vortex was a part—saved time and labor, stepped up production. The Best Foods Inc., found their Vortex "walking beam," spray type, automatic pasteurizer profitable, even though run only four months a year.

When *you* consider mechanization for a short season or year 'round operation, it will pay you to get all the facts on the many advantages of the Vortex.

. . What Is Your Problem?

B-W BOTTLE CLEANERS
PASTEURIZERS & PROCESSORS

BARRY-WEHMILLER MACHINERY CO.
4660 W. Florissant Avenue
St. Louis 15, Missouri

loads. Seals fit snugly without binding, and are formed to stay in place without squeezing out of shape or position. They are available on caster models with individual load capacities ranging from 175 up to 1,500 lb.

Felt seals to protect wheel bearings are available on Nicrosteel, forged steel, mold-on rubber, and industrial demountable wheels. Felt seals used are termed long-wearing and lubricant retaining.—*Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich.*

Circle 146B on Reader Service Card

Compact Circuit Breaker Saves Cost, Space

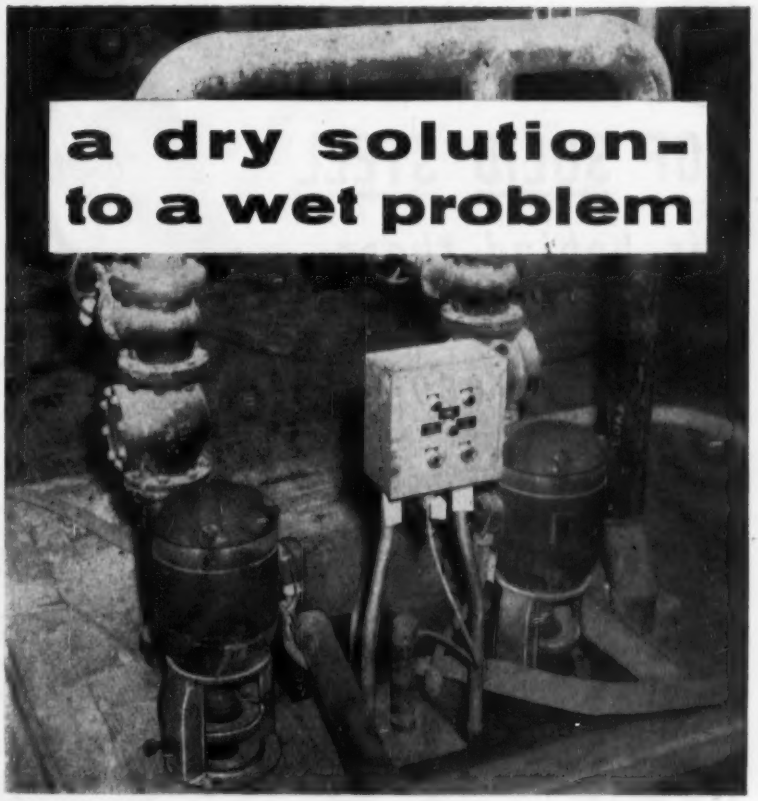
A new 400-amp.-frame circuit breaker reportedly saves cost and space by bridging the gap between existing 225- and 600-amp. models.

Designated "KL", it is designed for use in panelboards, switchboards, motor controls, bus duct plugs, and individual enclosures. This unit eliminates the need for the larger, more expensive 600-amp. breaker in circuits carrying 225 to 400 amp.

It operates as a thermal-magnetic circuit breaker with a quick-make, quick-break mechanism. Interchangeable trip units provide continuous rating versatility from 125 to 400 amp. Common trip operation is retained and an over-current on any pole kicks out all poles simultaneously.

Extra auxiliary devices—shunt trips, undervoltage trips, auxiliary and alarm switches—can be mounted inside the breaker case. New model is factory-calibrated and sealed to prevent tampering.

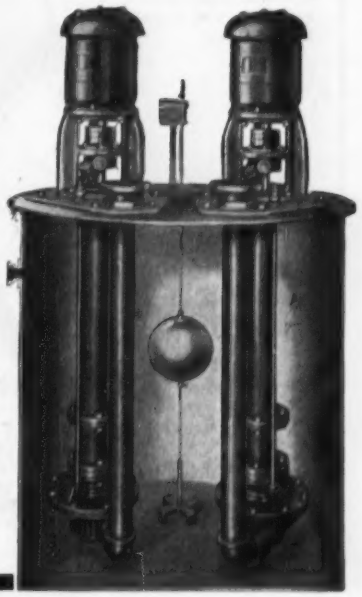
Unit is available in ratings from 125 to 400 amp., either 2 or 3 pole,



A large-volume user of water had a "wet plant problem." The solution is pictured above. Here you see two Deming Vertical Sump Pumps each with a 10 HP motor. Each pump has a rated capacity of 500 GPM with a 50-foot head. Unwanted water from all areas of the plant drains into a pit. When water in the pit rises to a predetermined level, one of the Deming Sump Pumps goes into action automatically. Or, if required, both pumps can be used simultaneously. If you have a "wet plant problem" there's a Deming Distributor near you to help you solve it.

DUPLEX UNITS

Where conditions require two pumps to operate separately, in sequence, or simultaneously, Deming Vertical Sump Pumps can be furnished as Duplex Units. The complete line includes a wide range of single and duplex units to meet most sump pump requirements. Write for illustrated BULLETIN 4600-A.



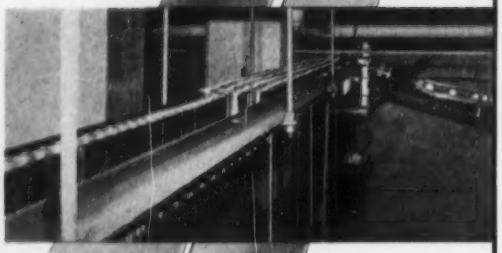
THE DEMING COMPANY
556 BROADWAY • SALEM, OHIO

75th ANNIVERSARY DEMING PUMPS 1880 - 1955

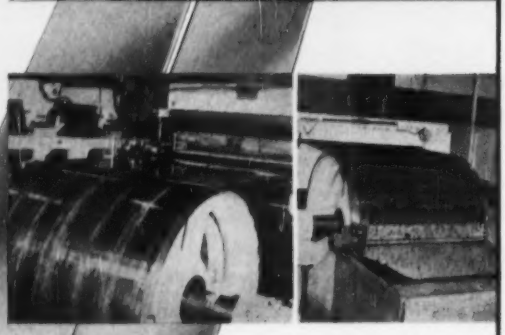
For more information, use coupon on last page.

A CONVEYOR BELT OF SOLID STEEL

is behind these Sandvik service records



Over 150 million cans of Hershey's chocolate syrup have been carried by this Sandvik steel belt conveyor.



More than 8 years of round-the-clock unattended operation is the performance to date of this Sandvik steel belt conveyor being used in producing Nestlé's Semi-Sweet Chocolate Morsels at Fulton, N. Y.

Sandvik belts used for similar applications in other companies have been operating successfully for over 15 years.

Here are two samples of the kind of long-lived, trouble-free conveying you can get from a Sandvik steel belt conveyor.

In addition to inherent stamina, the stainless or carbon steel belt gives you a smooth, flat, tasteless and easy-to-keep-sterile surface.

Sandvik builds complete conveyors for a wide variety of food-handling applications. Belts can be of any length or width.

Write, wire or phone for further information.

SANDVIK STEEL BELT CONVEYORS
Division of Sandvik Steel, Inc.
111 EIGHTH AVENUE, NEW YORK 11, N. Y., WAtkins 9-7180
Branch Office: 230 N. Michigan Ave., Chicago 1, Ill., FRanklin 2-5638
IN CANADA: SANDVIK CANADIAN LTD., 5675 Royalmount Ave. Montreal 16, P.Q.
Manufacturers Of Steel Belt Conveyors For Over 40 Years

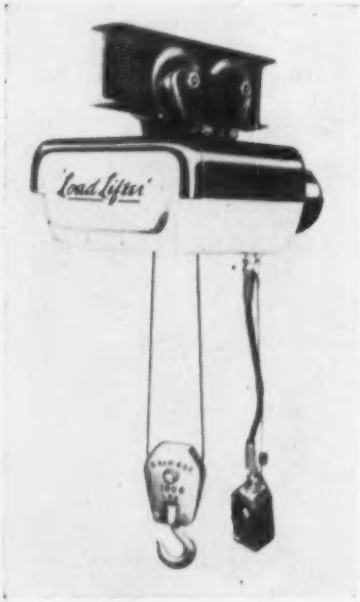
SANDVIK STEEL BELT CONVEYORS

SS-106

Equipment & Supplies

600 v. a.c., or 250 v. d.c. 25,000 amp. maximum interrupting capacity. More than one-third smaller than the 600-amp. breaker, it measures 9 in. wide, 15¼ in. high, and 5¼ in. deep, including handle.—*I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30.*

Circle 149A on Reader Service Card



Lightweight Electric Hoist Has Pushbutton Controls

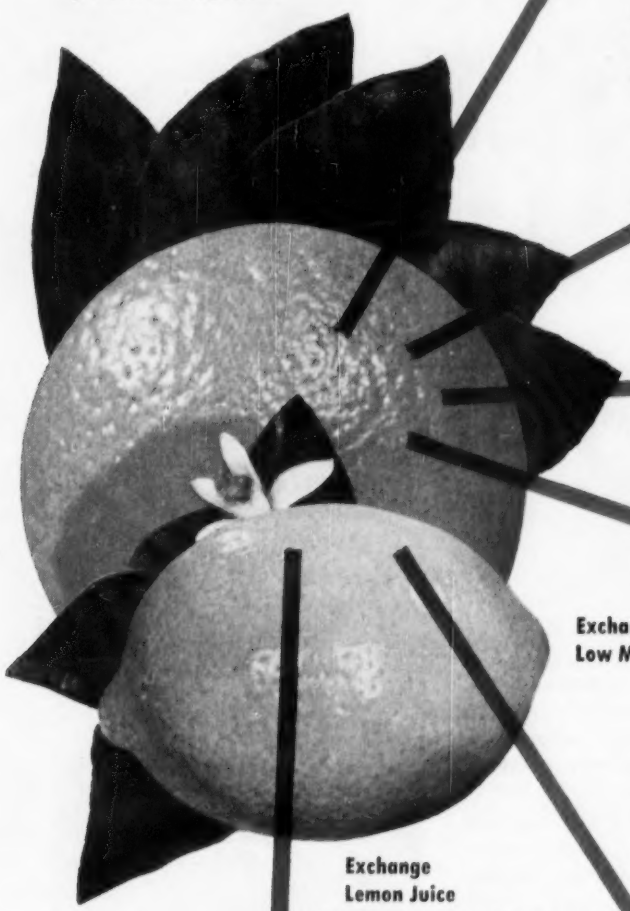
Action of this new, lightweight, small electric hoist, of the wire rope and drum type, is controlled by push buttons. Known as Series "600" 'Load Lifter' hoists are available with lug, upper hook, and trolley suspensions in capacities of 1,000 and 2,000 lb. and were developed especially for production lifting jobs.

New hoists contain many features that insure continuous performance and safety. Among their construction features are: Frames made from aluminum alloy, having unusual strength and shock resisting qualities; alloy steel heat treated gearing with machine shaved teeth; double brakes; magnetic control with only 24v. at push buttons; machine grooved drums of large diameter; interchangeable suspension and positive upper stop to prevent overtravel of hoist hook. Hoists are available for standard electric currents. — *Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore Inc., Muskegon, Mich.*

Circle 150A on Reader Service Card

Look to Sunkist
for progressive research in food processing

Yes, in every field of food processing, the Sunkist Growers laboratories are making ever-widening contributions to the increased quality of food products. Here are some typical Exchange Brand product developments.



Exchange Oil of Orange

Always consistent, always outstanding in flavor, strength and aroma. An essence you can rely on. Made from fruit grown in the famous Sunkist groves of California.

Exchange Oil of Lemon

The 4-to-1 favorite over all other lemon oils combined! The reason is the superior flavor that comes only from California-grown lemons processed by exacting Sunkist standards.

Exchange Preserver's Pectin

Here is *even* jell strength that gives you consistent, complete reliability in setting control.

Exchange Low Methoxyl Pectin

A natural fruit pectin that jells without sugar. Completely tasteless, permitting the use of the most delicate flavors. Pies made with Exchange Low Methoxyl Pectin won't "run" or "weep" when cut—and you have never tasted such natural juicy fruit flavor. Famous too for aspics, jellied fruit or vegetable salads, dietetic preserves or non-sugar jells.

Exchange Lemon Juice

Nothing can match lemon juice for bringing out the natural flavor of *any* food product. It's a superior acidulant in the preparation of mayonnaise, fruit cocktail, figs, fruit nectar, prunes and other heavy-syrup products. Highly effective as an anti-oxidant in processing frozen foods. Citric acid molecules have also been established as effective in the retarding of mold growth. Available in concentrated or single strength form.

Sunkist Growers

Exchange ®

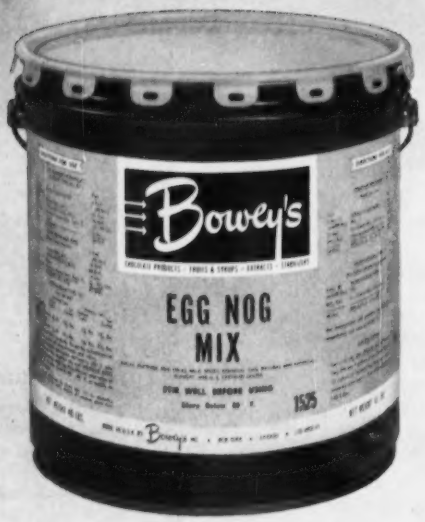
PRODUCTS DEPARTMENT • ONTARIO, CALIFORNIA
400 West Madison Street, Chicago 6, Illinois
99 Hudson Street, New York 13, N. Y.
318 Cadiz Street, Dallas 2, Texas

For more information, use coupon on last page.

"Another Product Safely shipped in Inland "protection-eered"* Containers"

perishable...

HANDLE WITH CARE!



There's a good chance that the delicious egg nog you bought during the holiday season from your local dairy was made with an egg nog concentrate from Boweys, Inc., one of the country's largest producers of flavorings and syrups for dairies and ice cream makers.

The refreshing drink you poured from a bottle on Christmas Eve probably started out in a steel pail at Boweys. Not just any steel pail . . . but an Inland "protection-eered" pail . . . lined with a special sanitary lining, tailor-made to retain the original, pure fresh flavor of Boweys' concentrated egg nog, during shipment.

If you have a problem with a hard-to-hold product that must be *handled with care* during shipment, it will pay you to talk it over with an Inland Steel Container representative. Inland packaging chemists have a reputation for solving the tough ones!

*the right container with the right lining for your product

INLAND

Write Mr. Robert Boecher, Room 240-D
INLAND STEEL CONTAINER COMPANY
Division of Inland Steel Company
6532 South Menard Avenue, Chicago 38, Illinois
Plants: Chicago • Jersey City • New Orleans
"It's better to ship in steel"

New Chemicals

Resin-Base Label Gums For Wide Temp Range

New line of hot pick-up gums, especially compounded for high-speed can labeling, reportedly provides excellent machining and tack characteristics at temperatures from 30-150 F. Gums, which are based on new improved resins, are available in four grades, each for use in a specific temperature range.

Other advantages cited: It comes in uniform chunks convenient for quick melt down; is non-foaming and non-stringing; does not build up on rollers; and has strong immediate tack.—*Swift & Co., Adhesive Products Dept., 4115 Packers Ave., Chicago 9.*

Circle 153A on Reader Service Card

New Lining System For Water Tanks

A ceramic base material for protecting and restoring water tanks is part of a new lining system offered for complete inertness to hot or cold water, and resistance to sludge and lime build-up. Method is seen applicable to old tanks as well as new ones.

Known as Expansolin, new material has the unique property of expanding and contracting with iron or steel to which it is bonded. A ¼-in. protective layer will not crack or otherwise fail when subjected to variable temperatures from 34-230 F. Nor is its effectiveness in preventing tank corrosion, by commercially neutral water, impaired by extreme temperature fluctuation.

Manufacturer states that this system results in a lining with excellent adhesion, increased heat exchange rates, good insulating value, and no contamination of tank contents.—*Emjay Maintenance Engineers, 327 Union Ave., Rutherford, N. J.*

Circle 153B on Reader Service Card

OTHER DEPARTMENTS
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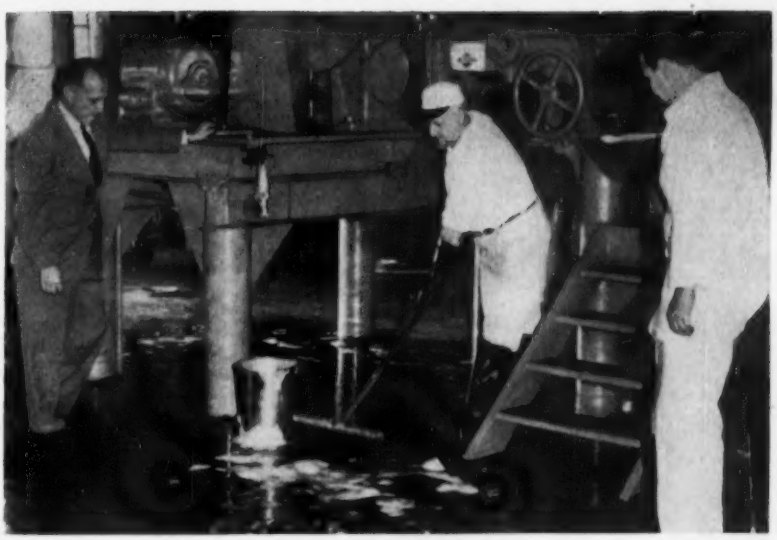

How processor takes the hard scrubbing out of cleaning

Clean-up men report Oakite Composition No. 67 saves effort—provides cleaner surfaces

At a large candy plant, as in all well-run food plants, cleanliness was strictly enforced. It meant continual, laborious scrubbing with brushes and cleaners to remove dirt, grease, drippings and sticky soils.

When asked for his advice, the Oakite Man suggested a trial of Oakite Composition No. 67. A few days' use told the story. Two typical applications illustrate the remarkable improvement. (1) After only a short soak in the Oakite cleaning solution, followed by a light brushing, pans were turned out cleaner than ever before. No longer did grease come to the top of the solution to contaminate cleaned surfaces; and no longer was hard scrubbing needed. (2) When applied to the tile floors, the Oakite solution proved equally effective. The man had only to apply the solution, let it soak, then mop it up.

Proving that—in industrial cleaning it pays to call on Oakite.

MANY WAYS OAKITE CAN HELP YOU

Oakite offers over 100 specialized materials, up-to-the-minute methods and equipment, and long experience—all of which make short work of cleaning and sanitation problems in food plants. More information in this booklet. Write Oakite Products, Inc., 27A Rector St., New York 6, N. Y.

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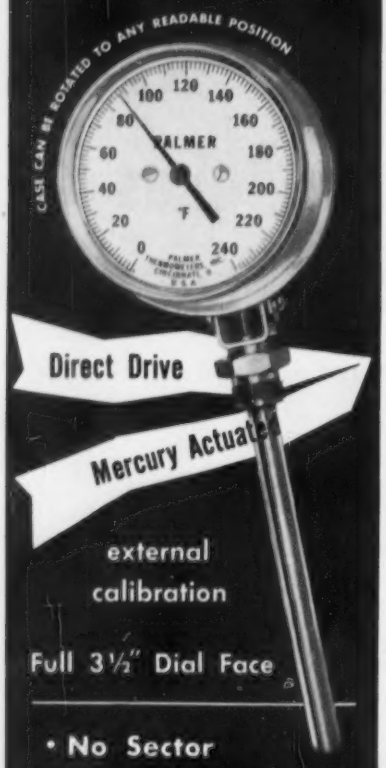

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Mfrs. of Industrial Laboratory Recording and Dial Thermometers

Double Maintenance

—Continued from page 93

quate supply of materials and tools needed for its completion. The assignment of crews to each job is a responsibility of the plant superintendent's office or of the plant engineer.

Year-Round and Seasonal

Here, a difference appears between plants which are in continuous operation on a year-around basis and those operating on a seasonal basis. In the former, centralized maintenance may be of benefit, although even there it may result in lost motion.

In plants which must operate on a seasonal basis, however, there are available a number of department foremen who, in the off season are not occupied with problems of production and should, therefore, be used to carry on the maintenance work in their respective departments.

Unless they are skilled mechanics in their own right, they would do the maintenance work under supervision of the head maintenance mechanic or the plant engineer. And in any case they should, whenever necessary, call on those men and their skilled craftsmen for aid.

Generally specialty mechanics for groups of such major machines as double seamers, pitting and peeling units, and labelers are a part of the operating crew of their foreman and so are naturally assigned to the machine's overhaul.

All routine overhaul work on such equipment as pumps, motors, conveyors, elevators, valves and piping, and other general service equipment, generally is done by the skilled crew of the plant engineer's (sometimes called head maintenance mechanic), on a predetermined schedule.

Building repairs, such as painting, minor carpentry jobs, etc., commonly are done under the supervision of the plant engineer. Larger repair jobs of a structural nature are mostly handled by outside agencies.

Outside Job

The annual adjustment of such vitally important adjuncts to plant operations as temperature and pressure recording and control instruments had better be left to the makers of those instruments, unless the plant be large enough to support an instrument department.

To the plant processing fruits and vegetables, condition of the supply of lug boxes is vital. A very considerable amount of money is tied up in a cannery's lug-box stacks. To prolong life of this equipment by timely repairs means a big saving.

Allowing these boxes to fall into bad repair means product losses and much waste of time in operation of box-dumping machines. It is the old story of "a stitch in time." This same applies to pallets also. Timely repairs, as soon as damage to a board is noticed, will save costly replacements and spilled or damaged loads. Fortunately, from a cost standpoint, off-season repairs of lug boxes and pallet boards may be done on a fill-in basis.

Another important off-season maintenance job, pertinent immediately following end of the season, is thorough cleaning of still-adhering product particles from all equipment, plus finding, cleaning, and painting of all metal surfaces showing corrosion.

The first part, that of removing any food particles or slime, need not be very extensive where efficient sanitation methods have prevailed.

For cleaning surfaces where rust begins to show, labor-saving tools, such as power-driven rotary wirebrushes, are indicated. The cleaning is then followed by application of acid-resisting primers and cover coats of paint.

The last job is often delayed to the end of the off-season. In many cases the after-season cleanup of equipment is made the responsibility of the department foreman.

Seasonal Maintenance

Each department foreman should, of course, keep a watchful eye on the equipment in his department and should be able to spot any weakness before it becomes serious. Either he takes corrective steps himself or he calls the maintenance mechanic or the plant engineer.

In making the choice of a proper lubricant, a food canner must consider not only the lubing properties

WATCH FOR THESE IN FUTURE ISSUES

Here are a few of a score of timely, practical articles, now being edited for publication in FE:

Review of High Court Decisions Important to Food Processors
Tips on Food Plant Labor Problems in 1955
How Small Firms Can Set Up Quality Control Program
Pooling of Production Cuts Costs for Four Companies
Food Factory Floors Which Require No Maintenance

of the oils or greases, but also the possible danger of product contamination.

Whenever there is possibility of the lubricant itself, or vapors distilled from it by heat, coming into contact with the product, a so-called tasteless and odorless lube should be chosen. Among the most likely points where such contamination may occur are the double seamer rolls and exhaust boxes.

Schedule Lubrication

For efficient trouble-free machine performance, good practice is lubrication at regular intervals, and for some machines during every mid-shift meal period—certainly at the end of each shift.

Labor cost in performing the necessary maintenance job can be greatly reduced by installing a central high-pressure lubricating system for each group of machines, such as pitting and peeling units and exhaust boxes and seamers installed as groups. This assures, in a fraction of the time, a much more thorough lubing job than possible with hand-operated grease guns. With such a central system, as many as four or five machines can be lubed simultaneously.

Where corrosion is caused by action of routine-applied water, as is often the case in continuous cookers and coolers, a chemical treatment of the water is indicated. Care must be taken, however, in selecting a chemical suited to the particular conditions in the plant. The chemicals must inhibit corrosion, yet must not cause spangling of cans. In cases where that type of corrosion is serious, a qualified chemist should be consulted.

Annual cost of water treatment is only a fraction of the cost of frequent or even occasional replacements of corroded angle and T-irons on the reels, or of the cost of faulty operations in cases where such replacements have been delayed too long.

Sanitation

Importance of sanitation in a food plant cannot be over-stressed. It is an imposing job to keep all equipment, floors, gutters, rest rooms, etc., free of rapidly accumulating organic growth, slime, and other filth in a cannery which, during the harvest season is almost continuously in operation.

Major Cleaning Tools

However, two powerful tools now do a much more effective job of cleaning than was possible under the old methods. At the same time, they do it in a fraction of the time. These tools are in-plant break-point chlorina-

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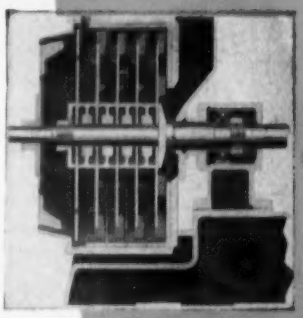

Cross section of the grinding chamber of our "Superfine" Pulverizer showing from left to right the cone plate, perforated mill plate and 4 beater plates with multi-section liner divided by annular rings.

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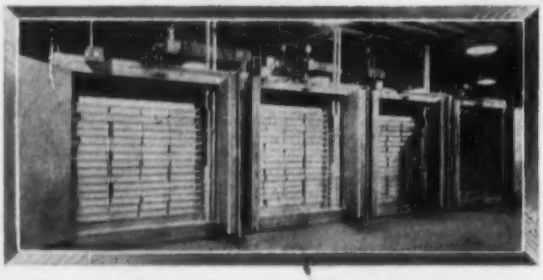

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tion and high-pressure cleaning systems.

Also there are more efficient detergents. In plants using break-point chlorination, all water entering (except that used for boilers, syrup or brine-making, and drinking fountains) is automatically chlorinated.

The chlorine concentration is held during operating hours, when the water comes in contact with the product, at just beyond the breakpoint. For after-shift washdown, it is raised to a much higher level. Chlorine added to water beyond the breakpoint prevents slime and odor forming facteria and mold growth.

Such water running continuously over conveyors, belts, pulleys, floors, and gutters reaches into otherwise inaccessible corners and crevices.

Aid of Treated Water

Use of breakpoint chlorinated water during the operating period has climinated slimy slippery floors and stair steps, thus greatly contributing to the safety of the employees, as well as to the sanitation of the plant.

High-pressure cleaning units are used, at the end of the operating shift, to clean thoroughly all equipment and floors. Hoses with specially designed nozzles are attached to the units to direct jets of detergent solution, of automatically controlled strength, at high pressure into every nook and cranny, and there dislodge all remaining traces of foreign matter.

These units may be mounted on casters and moved from location to location. Larger plants, however, often install a permanently located unit in each of the larger departments or areas having concentrations of equipment. High-pressure piping leads from the unit to strategically located hose outlets. Four or five nozzles can be operated simultaneously from each. Such permanent installations have proved to be labor savers.

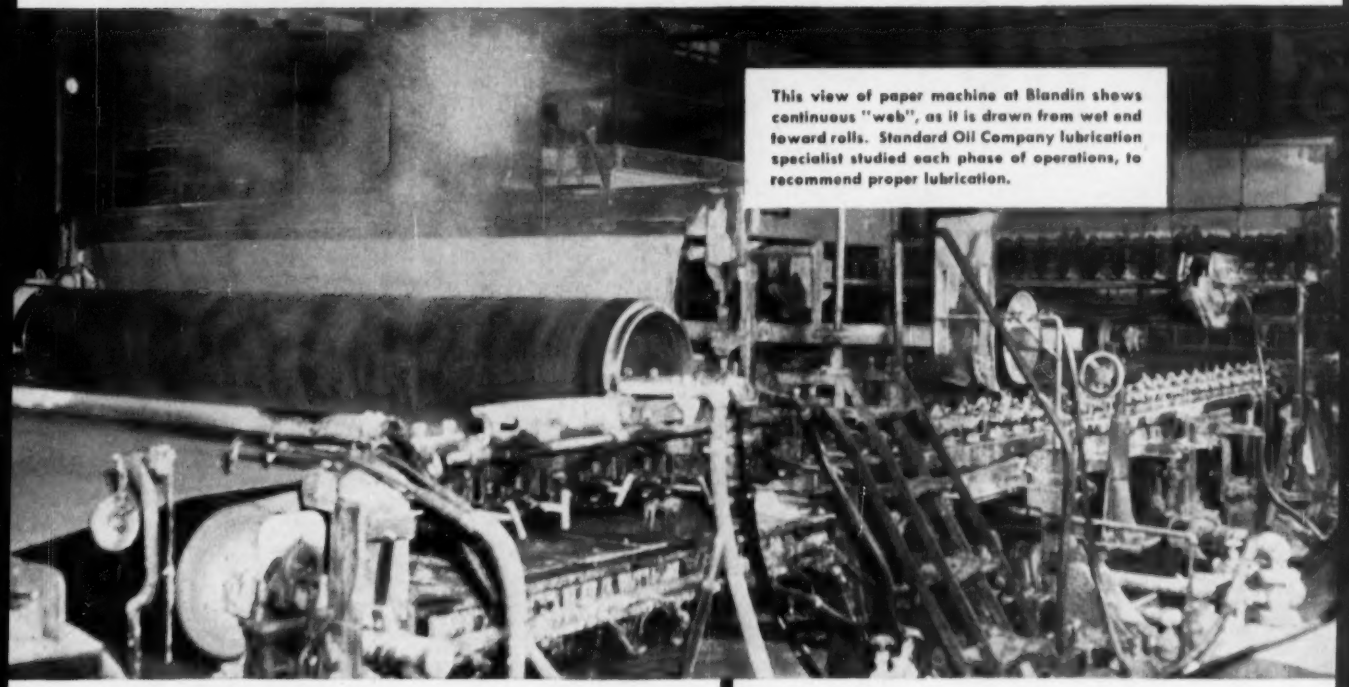
Washing of lug boxes after every use is a routine sanitation job deemed necessary, at least in all plants handling products with a pronounced tendency toward mold formation (such as tomatoes, cherries, and figs). It is common to convey the boxes from a dumping station, open-end down, over upward-directed jets of steam and water or diluted sodium hypochloride.

If this is not done, any mold which may adhere will continue to grow and transfer from load to load, until there is serious contamination.

To make any sanitation program a success, every worker from the superintendent down must be convinced of its desirability and necessity.

End *(Resume reading on page 94)*

STANOLITH GREASE *overcomes trouble spot, keeps paper rolling at* BLANDIN



This view of paper machine at Blandin shows continuous "web", as it is drawn from wet end toward rolls. Standard Oil Company lubrication specialist studied each phase of operations, to recommend proper lubrication.

STANOLITH Grease aided the solving of a rough lubrication problem at Blandin Paper Company in Grand Rapids, Minnesota.

A bottleneck on the paper making machines threatened production at this hustling paper plant four years ago. The trouble occurred near the beginning of the process, where the pulp contains up to 99% water. At this point, bearings are greeted by a shower of water and stock.

Greases were quickly lost, literally washed away. Bearings were ruined early in life. Not only had greases failed in their duty but they caused paper staining.

A Standard Oil lubrication specialist recommended STANOLITH Grease for use on the wet end of the paper machine. It did such a good job that Blandin maintenance personnel put this multi-purpose grease to work on other applications, too. Now, except when open gear and brick greases are required, STANOLITH serves the entire plant, replacing a wide number of single-duty products.

STANOLITH is truly a multi-purpose grease. It may be used almost anywhere on the job, in mechanical or hand-operated dispensers. STANOLITH Grease is heat and water resistant. It will reduce grease inventories, eliminate waste and prevent costly application errors. Find out more about how STANOLITH Grease can help you do many tough lubrication jobs with just *one grease!* In the Midwest call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Blandin maintenance man, Fred Harwood (left), and I. A. Westerlund, Standard Oil lubrication specialist, inspect a table roll bearing. This is just one of many places in the plant where STANOLITH Grease provides top-efficiency lubrication.

I. A. Westerlund is a graduate of the University of Minnesota with an engineering degree. He is also a graduate of Standard's Sales Engineering School, and makes good use of his training in providing technical service to customers. He's been doing this for 14 years. His customers find this experience and training pay off *for them.*

STANDARD

STANDARD OIL COMPANY (Indiana)

NEW PACKAGES & PRODUCTS

"A Can of Wine and Thou"

Lower packaging and shipping costs are reported by Yosemite Winery Assn., Madera, Calif., with the processing of a canned wine called Kan-O-Wine. Packaged under the Carina label, the wine is available in muscatel, white port, sherry, port, tokay.

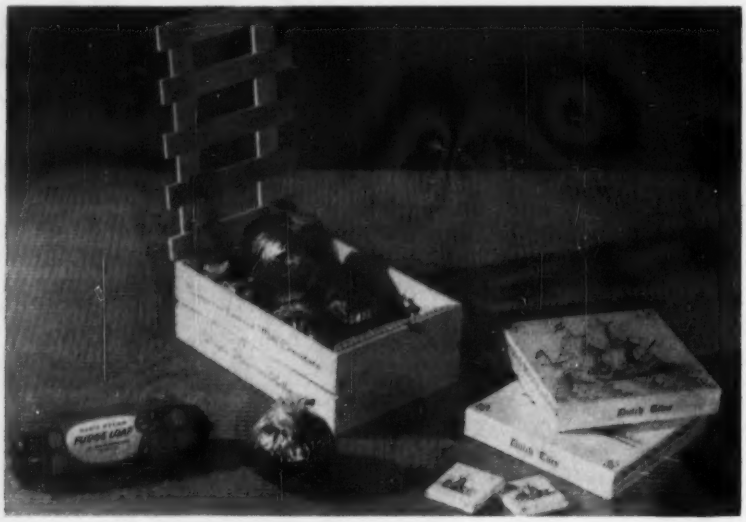
The 12-oz. cone-topped cans have easy-to-open crown caps. Weighing about ¼ as much as the same size glass bottle, the cans are dripless and light-proof.

Yosemite will continue to package wine in bottles. The same packaging line, with the exception of the capper, is used for bottles and cans. This unit can be converted from bottle screw caps to can crown caps.

The secret of successfully canning wine was in finding a satisfactory lining. Kan-O-Wine has a double lining of enamel and wax which protects the wine flavor. Enamel, baked onto the inside of the can before fabrication, is covered with a paraffin-base wax. With a melting point of 165 deg. F., the wax is relatively unaffected by heat.

Sold in California since December, Kan-O-Wine will eventually be distributed in other areas throughout the United States where Carina bottled wine is now sold.

Cans are manufactured by Continental Can Co. Caps are by Western Cork & Seal Corp., San Francisco, and crowner by Liquid Carbonic Corp., Chicago.



Tangerines, Tiles Spark Candy Sales

Attractive and unique packages for candy have been marketed by one American and two Dutch processors.

Droste & Co., Haarlem, Holland, has introduced a tangerine-flavored chocolate packed in a small wooden box resembling a produce crate. The chocolate itself is made of thin wedges in the shape of a tangerine, wrapped in gold foil, then in cellophane with simulated green leaves. Six "tangerines" are packed in each wooden box.

A. Driessen, Ltd., Rotterdam, Holland, is marketing attractive Dutch Tile chocolate tablets. Each tablet is wrapped in white paper printed to resemble a tiny dutch tile. This motif is carried through to the flat, tile-shaped carton.

Deb's Candy Inc., a new processor located in Evanston, Ill. is making a pecan fudge loaf, wrapped in saran. The processor uses a standard sausage machine for packing. The package extends shelf life of the product. The loaf is 6 oz. in weight.

Heat Seal Label Perfected

An ingenious collar-type heat seal label on film that is applied at the same time the bag is formed is being used by West Coast produce packers. The new method, developed by Nashua Corp., Nashua, N. H. (158A), eliminates the delay of positioning the label beforehand.

The printed labels are placed across the web of the film in predetermined positions before the bag machine is started, and are activated and secured during the bag-making operation. About 1½ in. wide, the labels partly circle the bag ¼ in. from the top, leaving enough space at the back for sealing the bag. The bags are then filled and sealed on automatic roto sealers.

The label is part of the final seal applied by the roto sealer.

The labeling system is particularly adaptable for produce, candy and crackers.

Identification of the product is retained because the bag is opened simply by breaking the seal at the rear seam, leaving the entire label intact.

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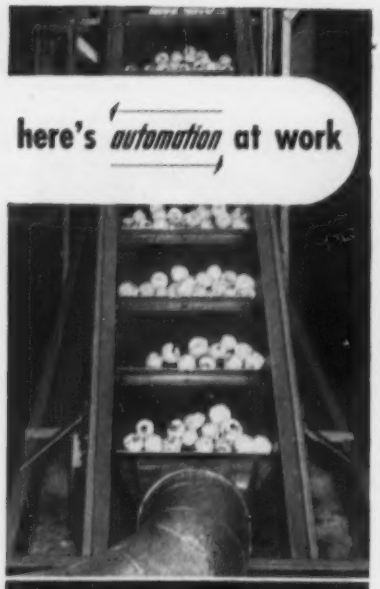

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OFFICES IN LEADING INDUSTRIAL AREAS

Tasty Palm By-Product

Heart-of-palm, a delicacy well known in warmer climates, has been introduced in the United States by El Dorado Products Co., a Florida processor.

Distributed by Charles & Co., famed New York fruiterers, the product is packed in 1-lb. cans under the Palmito tradename. The tender palm hearts have a crisp, nut-like flavor, and may be served as a hot vegetable or as an appetizer.

The product is a result of three years of extensive experimentation by the processor. Formerly, the only source of the delicacy was Brazil. Then El Dorado Products Co. realized the worth of the by-product which was being wasted by U. S. palm growers.

Production is limited since only one palm heart is obtained from each palm, and the tree must not be more than six years old.

Poly Box for Cheese

Crescent Cheese Co., Montreal, Canada, is marketing Creamed Kurds Cheese in a novel plastic package. Made by American Paper Box Co., Ltd., Montreal (160A), the container is rectangular, and made of thin polyethylene. The base is vacuum formed. Shape of the container lends itself to easy stacking.

The top is a lamination of cellophane and polyethylene made by Cheslam Corp., Yonkers, N. Y. (160B). The top is heat sealed to the container and offers a good printing surface as well as transparency.

The consumer opens the package by inserting a knife along a dotted line on the lid.

The package is low in cost and may be used for ice cream or similar products.

Tabbed Bottle Cap

A bottle cap with a built-in tab that allows removal without the use of a bottle opener, has been perfected by William Satz, Los Angeles (160C). The tab, extending at a 45° angle from the crown, protrudes just far enough for the user to place a finger under it to flip the cap off the bottle.

Cap and tab are made of standard tin plate in the usual crimp-crown shape. Laboratory tests reportedly have shown the cap will hold 150 lbs. per sq. in minimum pressure before leakage.

The minimum required pressure for carbonated beverages is 100 lb. per sq. in.

Non-Stain Oil Label

Kraft Foods Co. has adopted a foil label for its new all-purpose oil. The new label solves the difficulty of label stains, a serious sales problem. Using the same colors and format as the paper label, the foil may be wiped clean with a cloth when oil is spilled on it.

Developed by Kraft packaging experts, the label retains the exclusive Kraft pull-out tab, which allows the consumer to see at a glance how much oil remains in the bottle.

In addition to practical advantages, the foil also heightens label colors and adds sales appeal.

Musical Lid for Cheese

A reusable plastic dish covered with foil is topped by a child's phonograph record to make a unique package for Sylvan Seal creamed cottage cheese. The idea was developed by the National Sales Council of Philadelphia, Inc., for the dairy industry. There are 12 records, one for each day of a 12-day sales campaign. They range from nursery rhymes to Christmas carols and are standard 78 rpm. disks.

Containers and records are made by Precision Plastics Co., Philadelphia (161A).

No-Bake Pie Mix

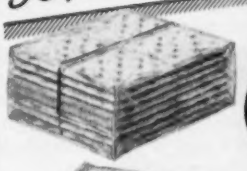
A ready-mix for a pie that requires no baking or cooking is a new product of 6 O'Clock Foods, Inc. Fluffy Angel Pie, packed under the company's 7-Minit label, consists of dry mix ingredients that need only the addition of boiling water and chilling to make an eggwhite filling and a toasted graham cracker crust.

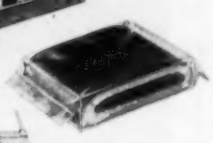
The carton contains two envelopes, one holding the crust mix, the other holding the egg white filling mix and a lemon flavoring capsule.

Melted butter or margarine is added to the crust mix. Then it is

Printing Costs..... $
Wrapping Materials.... 250.00
New cost — $1250.00
50% savings in materials!

"JUST ONE REASON WHY
we're using CAMPBELL WRAPPERS
throughout our bakery chain!"





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molded to the bottom and sides of a pie plate, and chilled. Then boiling water is added to egg white powder.

Next, the mixture is beaten rapidly, with the contents of the flavor capsule being added. The filling is then poured into the chilled crust and the entire pie refrigerated for an hour.

Instant Flavors Debut

Dell Food Specialties Co., Beloit, Wis., has introduced Bar-B-Q Instant Mustard and Bar-B-Q Instant Sauce to the institutional trade. The flavored powders convey a true barbecue flavor, and provide a simple and economical method for flavoring foods.

One pound of the powder brought to a boil in one gallon of water and allowed to simmer provides a tasty sauce.

The mustard is made by adding water to the powder until the proper consistency is reached.

Another Pizza Kit

Complete ingredients for a tasty pizza are now contained in a package marketed by Daino Products Inc., Ithaca, N. Y. The package consists of a foil pan with a windowed cardboard cover. Four bags contain pie crust, sliced cheese, grated cheese, and tomato sauce. Ten in. in diameter, the pie package weighs 10 oz.

Bags are vacuum packed on Standard Packaging Corp. machine (162A).

Mullet in Cans

A new fish product, canned Florida mullet, has been developed by the Food Technology Department of the University of Miami. Canned mullet has a texture and flavor similar to canned salmon. It has met with consumer acceptance when tested as a salad or made into croquettes. The development is a result of four years of storage and production testing.

Canned French Dessert

French-type rum cakes are being packed in #2 cans by the Bertauche Co., San Anselmo, Calif., under the La Ville label. Each can holds 12-oz. of the dessert, standard home-cooking fare in Europe. Cans are by Continental Can Co. and are lithographed.

Fruit Pie Fillings

Five types of fruit pie fillings are being processed in cans by C. H. Musselman Co., Biglerville, Pa. Packed in No. 2 cans, the fillings are pineapple, apple, blueberry, cherry, and peach.

Each can contains 1 lb., 5 oz. of ready-to-use filling, enough to fill a deep-pie plate 8 in. in diameter.

High-Concentrate Essence

A new natural chocolate essence of high concentration is being marketed by Heyman Process Corp., Brooklyn 7, N. Y. (162B). The essence may be used to boost the natural chocolate flavor of processed confectionery or to reduce cost of chocolate base products.

Called Chocolate Mello Concentrate, the flavor is reported to return some of the volatile flavors to processed chocolate products. It is then possible to use the cheaper grades of cocoa with less butterfat without noticeable loss of flavor.

The flavor is free of fiber and does not form sediment or spoil. One ounce is sufficient to boost the chocolate flavor in two gallons of ice cream.

Two Cheese Spreads

Introduced recently were two new cheese spreads:

CheeZest is a pasteurized process cheese spread made by L. D. Schriber & Co., Inc. A high protein food, ideal for sandwiches, rarebits, cheeseburgers, and macaroni dishes, the spread is packed in glass jars in 1-lb. and ½-lb. sizes.

Dell Food Specialties Co., is marketing an instant cheese spread under the Lazi-Sue label. In powder form, the spread is mixed with water to prepare. It is packed in both 1-lb. and 3½-oz. sizes.

New Products Shorts

Another Canned Pop Debuts

Independent Grocers' Alliance will introduce soft drinks in a 12-oz. flat-top can. The product will be merchandised in a 6-pack carton.

Third Television Dinner

Frozen beef pot roast dinner is the latest addition to C. A. Swanson's TV Dinner line.

Prepackaged Meat Loaf Mix

Pesta Foods, Inc., Cleveland, is marketing a prepackaged meat loaf mix under the Tempo label. The mix includes onions, parsley, tomatoes, and bread crumbs blended with spices.

New Bread Wrapper

Fabricon Products, Inc., River Rouge, Mich., has developed a new waxed paper coating for bread wrappers. Called Waxello, the coating feels softer, and has better blocking qualities.

Dessert for Baby

Fruit dessert with tapioca is Gerber's Baby Foods' newest fruit item. It combines apricots, orange juice, pineapple juice, and tapioca and sugar.

Little Things Count

—*Continued from page 84*

veyor. A 6-in. rectangular opening in the forward, top portion of the box serves as magazine for stacks of empty bags.

A stack of empties is loaded onto a metal supporting plate within the opening. Plate is free-swinging at one end and attached to a spring and a horizontal, ¼-in. metal rod at the other. As each bag is removed, plate moves upward bringing stack along with it.

Welded to the other end of each box is a 1¼x3-in. pipe—slightly tapered at the end. Hooked up to the pipe is a flexible metal cable running to an 8-in. blower mounted below the packing table.

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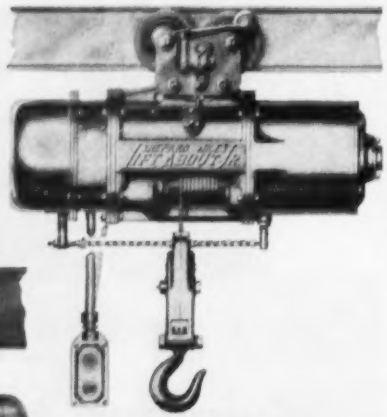

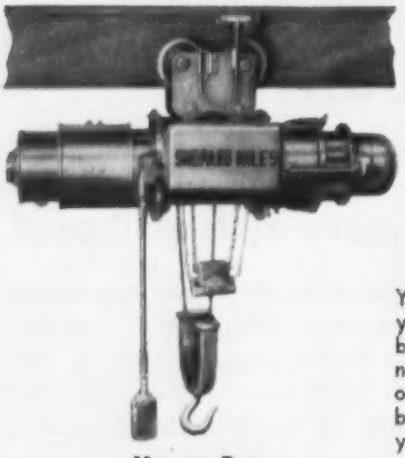

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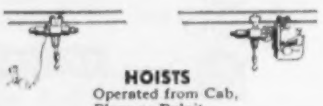

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. . . And now we go back along the line for two further innovations—

7—Blueberry Cleaner

Manual task of hand-removing the lighter leaves, twigs, and other foreign matter from blueberries has been abolished. Task-easer is a simply designed cleaner that handles up to 3 tons of blueberries a day.

Berries are now cleaned by dumping them into a 1-bu.-capacity stainless steel hopper, with a 1x10-in. slot in the bottom through which the fruit drops. Hopper is mounted on a metal frame (3x3 ft.), with a 16-in. fan attached to it about half way between the floor and hopper slot. As the berries drop into a container, the fan blows away the lighter foreign matter.

8—Portable Dough Bins

Work has also been simplified by company-built bins—portable, stainless steel, waist-high dough bins for moving dough from mixer to cooler and then to dough divider.

Each of these 1,000-lb. capacity units consists of a heavy gage stainless sheet bolted on top of a pipe-frame (1½ in.) with four rubber-clad, ball bearing-type casters. The back of each bin is a vertical 2x6-ft. stainless sheet, and the stainless sides are triangular shaped.

Bin-loads of pastry dough are now easily rolled to the 40-deg.-F. cooler for conditioning. They then are pushed over to the pie make-up department, where the dough is easily fed, without bending and lifting, to the divider. Here, the dough is formed into four 11¾-oz. balls at a time—each enough for the top or bottom crust for four 4-in. pies. Balls of dough are then belt-conveyed to the dough sheeter and rotary pie make-up table.

Layout Thinking Contributes

Good plant layout tactics also aid the pie company.

Sufficient raw materials for a few days' production are stored adjacent to a 160-lb. capacity mixer (Artofex), with bags of flour and drums of shortening on one side and bags of sugar on the other. Nearby, too, is a double, stainless steel bin that holds 100 lb. of salt and the same amount of corn starch.

Ahead of the mixer are the dough divider and rotary pie-making machine. Along one side of the 200-dozen-per-hour pie table is the kitchen for preparing various pie fillings. On the other side is the oven, with the pie-cooling and packaging areas farther ahead.

End *(Resume reading on page 85)*

40

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INSIDE SCIENCE

The Vital Story of BREAKFAST CEREALS

with essential vitamins and minerals restored

by Science Writer

This article is one of a series devoted to the story of vitamin enriched or restored cereal products: white bread and rolls, white flour, corn meal and grits, macaroni products, white rice, breakfast cereals, farina.

Increasing in popularity over the years, breakfast cereals are used throughout the United States by young and old alike. Eaten with fruit and milk or light cream, they contribute an excellent combination of basic, flavorful, nutritious foods to the diet.

In the past decade the use of these fine foods has grown markedly. In fact, it is estimated that there has been a 20% increase during the period. In 1953 the increase was much higher than the average of previous years. It was 5.5%.

During 1953, for example, many tons of breakfast cereal foods were eaten in the United States. Industry figures show that 4.6 pounds of dry cereals and 2.5 pounds of hot (cooked) cereals per person were consumed.

Many grains are processed to make breakfast cereals: wheat, corn, rice, oats. Often these foods may be eaten just as they come from the manufacturer's package. Or they may require only a short period of cooking to be ready for the table. They appeal to busy home-makers, as well as to institutional dietitians, because they are readily available in a variety of flavors to add interest and value to an important, but sometimes neglected, meal.

A Nutritional Advance

As the science of nutrition advanced in recent years, it was found that losses of essential vitamins and minerals occurred during processing of wheat, corn and rice into breakfast foods. When this became known, most manufacturers acted to overcome the losses. They adopted restoration.

Restoration simply means that certain vitamins and minerals are added to the cereal food during processing so that the finished product is generally equal to the whole grain values of those elements. The vitamins thiamine (B_1), riboflavin (B_2), and niacin as well as the mineral, iron, are used in restoration. Vitamin D is also added sometimes.

The recent trend toward pre-sweetened cold cereals for breakfast consumption and between-meal snacks emphasizes the nutritional importance of vitamin fortification. Increased calories require more "B" vitamins for proper utilization.

What the Vitamins Do

Thiamine is the vitamin which helps to build and maintain physical and mental health. It is essential for normal appetite, intestinal activity and sound nerves.

Niacin, which is another of the "B" vitamins, is needed for healthy body tissues. Its use in the American diet has done much to make a serious disease called pellagra disappear.

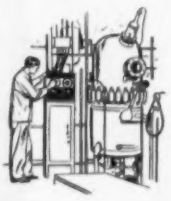
Riboflavin is the vitamin which is essential for growth. It helps to keep body tissues healthy and to maintain proper function of the eyes.

Vitamin D is important to prevent rickets in children and the development of certain abnormal bone conditions in adults.

Iron is essential for making good red blood and for preventing nutritional anemia.

Where Do The Vitamins Come From?

At about the same time that processing losses in breakfast cereals became known, other developments in the science of nutrition produced ample supplies of vitamins at economical prices. Thus, the quality of breakfast cereal foods could be, and was, greatly improved through restoration.



Since the early days of breakfast food restoration and of white flour and white bread enrichment, the world-famous firm of Hoffmann-La Roche has supplied top quality vitamins by the tons. Pioneering work in its laboratories and by its collaborators resulted in the "duplication" of some of Nature's extremely complex substances. First, the chemical composition of the vitamin was learned. Second, the pure substance was isolated. Third, the "duplicate" was made by synthesis. And fourth, the laboratory techniques were extended to large scale operations.

The manufactured "duplicate" is identical chemically and in biological activity with Nature's own product. A vitamin is still a vitamin regardless of its source. So efficient is large scale manufacturing that vitamins are sold at a lower cost than if they were extracted from natural sources.

Reprints of this article, and of all others in this series, are available without charge. Please send your request to the Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 286 St. Paul Street, West; Montreal, Quebec.

ADVANCES IN TECHNOLOGY

Frozen Concentrated Milk

A new process for preparing concentrated milk that is said to remain unchanged for extended periods if stored at −20 F., has been developed at Iowa State College.

Milk is pasteurized by holding at 180 F. for 16 sec., homogenized, concentrated, and homogenized again. Following canning concentrate is again heated to 180 F., then frozen at −15 to −20 F., and stored at 120 F.

When thawed and reconstituted with 2 parts of water product is said to taste the same as fresh homogenized milk. Concentrate will keep perfectly for 2 weeks at 40 F.—Information Service, Iowa State College.

Fruit-Flavored Beverage

A new type fermented drink that is said to be sparkling, thirst-quenching, and can be produced in a number of flavors is the subject of a recent French patent application.

First step in the process is preparation of wort base directly from raw grain, resembling a non-hopped brewery wort. This is fermented in a closed vat to desired alcoholic content and filtered.

An alternate method is to ferment whey or milk to form the wort. Here, a stabilizer may be added to preserve the milky appearance when cloudy finished drink is desired.

Flavoring is then added to wort. This may be natural fruit juices such as orange, pineapple or black currant, or coffee, tea, or chocolate. Beverage is bottled, with added carbonation when desired, and pasteurized.

Finished products are said to be slightly acid, with a combined bitterness-sweetness due to presence of non-fermented dextrines and fruit juices. They are said to have a special lightness as contrasted to corresponding beverages of the same flavors—Edouard Klein, Paris.

Quick Meat Control Test

Determining both moisture and fat content of a large number of meat products in approximately 30 min. is now possible using a new method developed by American Meat Industry Foundation.

Procedure follows: Weigh out 10g. of ground sample and transfer to 250 ml. distilling flask. Add 100 ml. capryl-primary octyl alcohol mixture (made by adding small amount of primary octyl alcohol to capryl alcohol), then connect flask, collecting trap and condenser. Heat until all water is distilled over, read volume of water in ml., and multiply by 10 to get percent moisture in sample.

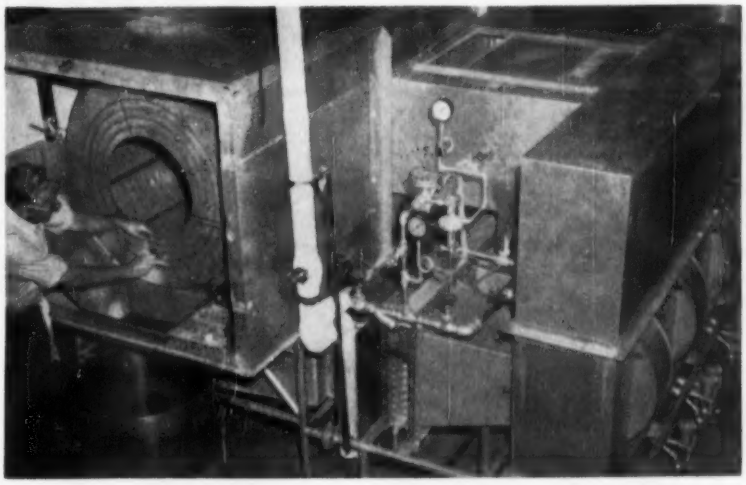
To obtain fat content, cool residual fat-alcohol solution, decant into test cell of Steinlite tester, make scale and temperature readings. Fat percent is obtained from previously prepared chart. (Chart will soon be available).

Combined test can be performed by non-technical person in 30 min. It gives values within 3% of standard laboratory methods—Amer. Meat Institute's 49th Annual Meeting.

Source of Sunlight Flavor

The typical hay-like flavor that develops in fortified skim or low-fat milk appears to be associated with presence of added vitamin A.

This was indicated in experiments



Continuous Rotary Dryer For Foods Combines Mixing and Air Movement

Following several years of laboratory and pilot-plant research at WURL, Albany, Calif., dehydrofreezing of fruits and vegetables is undergoing commercial trials.

In the process, approximately 50% of the moisture is removed from the product, which is then frozen. Advantages seen are savings in containers, shipping, storage, and handling while retaining quality level of conventional frozen foods. Thawing and rehydration can take place simultaneously to obtain desired moisture content.

In drying step care must be exercised to remove desired quantity of moisture before temperature of pieces rises to point where changes, characteristic of ordinary dried products, occur. This indicated need for continuous drying of products such as apple slices, peas, and pimientos. Also, fruits susceptible to enzymatic browning require sulfiting before drying.

To meet the first requirement, engineers, at WURL developed a continuous rotary dryer (photo above). It has performed satisfactorily with apple slices and peas, but not entirely so with pimientos which tend to stick to dryer surfaces.

In this dryer, a wire-mesh liner was inserted inside the perforated sheet-metal rotating drum to prevent sticking. And longitudinal wood strips were attached to sides to turn product.

Drum is 10 ft. long, 3 ft. dia., and rotates at 4 rpm. Air is delivered by 4 separate ducts, each with its own blower and steam coils. All, or part, of air can be recirulated. Product enters at one end, is discharged at other.

Good results have been obtained with sulfited apple slices using dry-bulb temperature of 200 F., and wet-bulb temperature of 130, and bed depth of 7 in.—*Food Technology*, 500-502, Nov. 1954.

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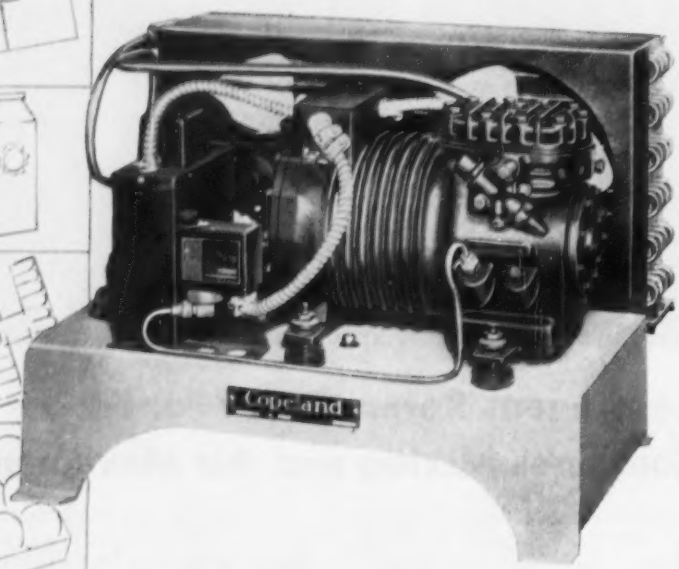

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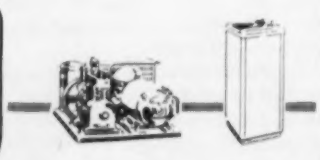

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with fortified and unfortified skim milk exposed to sunlight and fluorescent lighting. Fortified milks developed off-flavors following exposure to sunlight for as little as 2 min. Unfortified milks were not affected.

Action of light was inhibited by addition of ascorbic acid, and antioxidants such as NDGA and BHA, and by use of amber bottles or paper containers.—*Journal of Dairly Science*, 1346-52, Nov. 1954.

Sulfur Dioxide Found Best For Pre-Peeled Potatoes

When packed in polyethylene bags and stored at 32-40 F., pre-peeled potatoes immersed 15 sec. in solution of 10,000 ppm. SO_2, will have a storage life of approximately 3 weeks. Longer immersions in more dilute solutions will accomplish the same results.

Experiments were conducted using Green Mountain, Katahdin, Chippewa, and Kennebec varieties from Maine, and Green Mountain, Katahdin, and Irish Cobblers from Mass. Temperatures of 32-40 F. and 65-75, sodium bisulfite concentrations to give 500-10,000 ppm. SO_2 were tried.

In early tests with low concentrations of SO_2, dipping times of 2-10 min. were required to attain 14-16 days shelf life. By increasing SO_2 concentration to 10,000 ppm. a shelf life of 2 to 3 weeks at 32-40 F. was obtained with a 15-sec. dip. Maximum life of 2 days was attained at temperature of 75 F. Air drying dipped potatoes reduced shelf life at 32-40 F. by about 60%. Addition of calcium propionate (3%) or disodium acetate (3%) to the SO_2 solution also reduced shelf life of dipped product.

Reducing agents and chemicals other than SO_2-containing ones were found valueless, and blanching by immersion in boiling water was unsatisfactory due to time required—10 min. for 3 x 2-in. potatoes—and need for different times with different size potatoes.—*Food Technology*, 569-73, Dec. 1954.

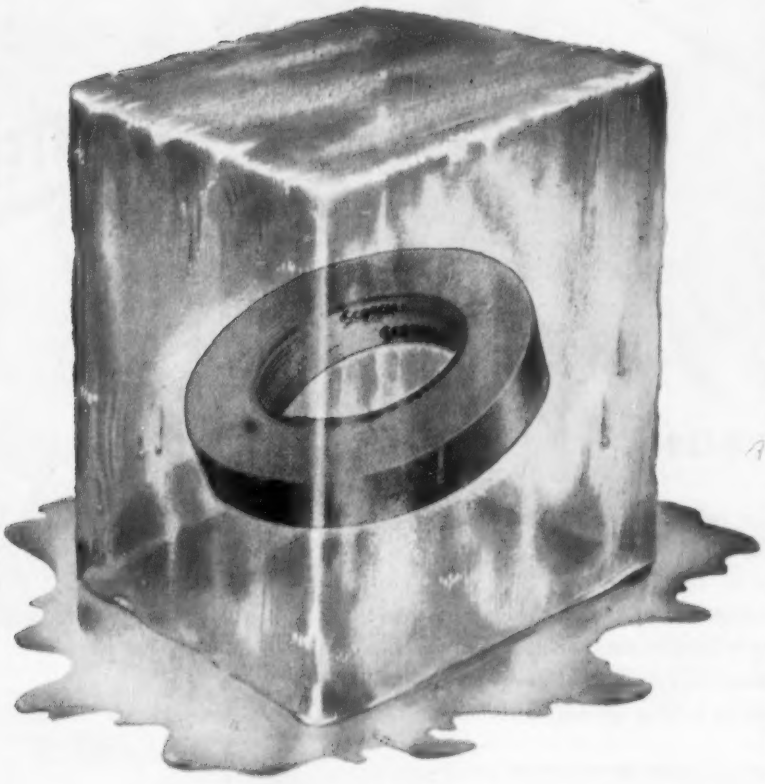
Stabilizing Wine

Wines with cleaner taste, better color, and satisfactory heat and cold stabilities can be obtained without heating by means of bentonite-gelatin clarification. To obtain best results, the bentonite should be added before the gelatin.

Procedure found best in laboratory and plant trials is:

1. Add 3 lb. bentonite/1,000 gal. wine as slurry of ½ lb. bentonite in 1 gal. wine shaken vigorously for 1 hr.
2. Add 4 oz. gelatin/1,000 gal. wine as 6% solution in warm water.

TAPE that sticks in freezing cold



Tough, moisture-resistant tape that sticks at a touch . . . holds tightly to wax, or plastic treated papers . . . even at extremely cold freezer temperatures! Available in 12 attractive colors to match or contrast with printed cartons or wrapping papers. For complete information, write on your letterhead to Dept. FE-15.

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SECURE PACKAGING for cold cabinet displays is easy with "Scotch" Brand Tape No. 710. Hams, bacon, meat cuts, etc., are attractively wrapped with this tight-sticking tape.

EYE-APPEAL can be added to combination "deals" with "Scotch" Brand Acetate Fibre Tape *in colors*. Here, wax-treated cartons are banded together for cold cabinet displays with a "Scotch" Brand Package Bundler.

FASTER WRAPPING of ice cream packages is accomplished with "Scotch" Brand Tape No. 245 and a "Scotch" Brand Box Sealer. Package is simply passed over roller; pre-determined length of tape is automatically applied.

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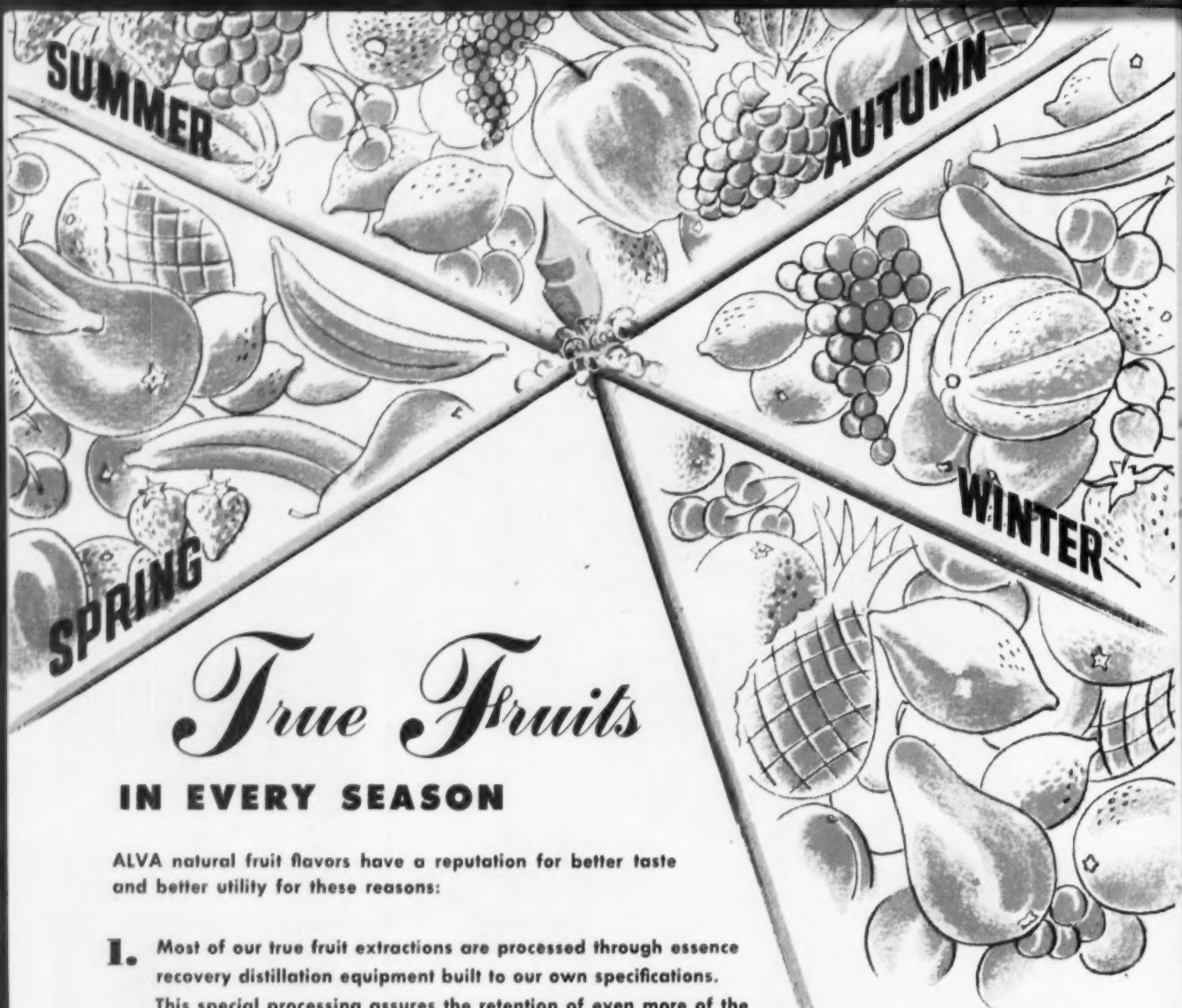

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ALVA natural fruit flavors have a reputation for better taste and better utility for these reasons:

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2. Storage facilities are maintained under ideal control conditions, improving the life of flavors and guaranteeing freshness in each delivery.

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Alva FLAVORS

Each should be added through Y on suction side of centrifugal pump connected to circulate wine from bottom to top of vat.

3. Cool dessert wine to 16-18 F., table wines to 23-25 F., and hold 19 days with mild agitation. Allow to settle 2 days and filter through plate and frame unit with canvas cloths and diatomaceous earth.

4. Insert papers on canvas cloths, precoat and polish.

A brown, oxidized pigment is removed from white wines, and red wines retain more color than when fining and chilling are used separately. All seemed cleaner to the taste with the desirable varential character apparently unaffected. Processing losses were reduced, and processing time cut approximately 1 month—*Food Technology*, 565-66, Dec. 1954.

Vinegar Generator Studies

In pilot-plant tests, coke, rattan, and Berl saddles were found to approach standard beechwood shavings as packing material for vinegar generators if nutrients in the feed were adjusted for them.

Specially denatured alcohol 35A (5 volumes of ethyl acetate to 100 volumes of 190 proof ethyl alcohol) diluted to 9.0-9.2 g. of alcohol per 100 ml. was the basic feed. To this fermented malt extract, autolyzed yeast, and corn-steep liquor were added as needed. The last two proved useful with packings that are either deficient in surface, or whose surfaces are not readily coated by vinegar bacteria.

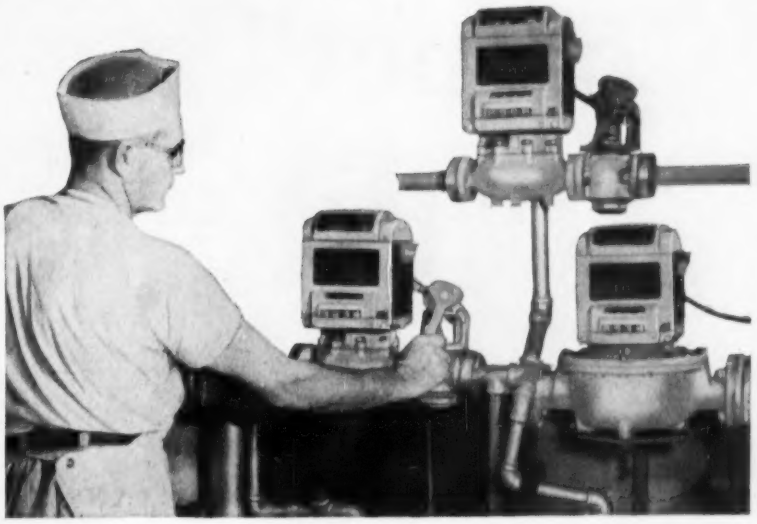
Autolyzed yeast is an especially favorable addition to vinegar generator feeds, and a rise in efficiency always followed its use. Nutrients should be kept at the minimum level required for efficient generator operation, but below the quantity that stimulates slime formation—*Industrial & Engineering Chemistry*, 2023-26, Oct. 1954.

Changes In *Torula Utilis*

In hydrolyzed liquors from cellulose-bearing tissues such as straw or reeds, *Torula utilis* cultures (after about 5 aerations) tend to form a stiff foam, containing up to 17% yeast dry substance, which is difficult to break, hard to remove from the fermenter, and resistant to efficient separation, pressing, and drying.

Because contact with nutrients is poor, yield and quality of yeast grown in this way is very poor. Condition is not an infection, nor is it infectious. It seems to be due to the development of mycodermal and monilial forms by

Three Neptune Meters Boost Production 200%



Less than half a minute of a man's time is required to measure three ingredients . . . corn syrup, liquid sugar, and water . . . into each batch of Nalley's table syrup. The operator simply pushes buttons on the Neptune Auto-Stop meters to set the pounds required by the formula, and opens the valves. The Auto-Stops shut off automatically . . . accurately . . . leaving the operator free to devote full attention to other details.

One man now produces more than three times as much as formerly was produced by five men handling bulk sugar and barreled corn syrup.

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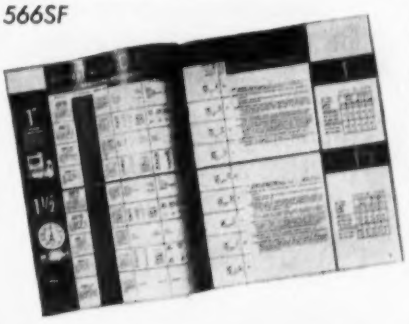

This Auto-Stop batching meter is only one of many models and sizes of Neptune meters . . . ranging from meters with simple counters to electric switch adaptations and remote control systems . . . now handling more than 150 different industrial liquids. Sizes from 25 to 1000 gpm. Bronze construction. Telephone or write nearest branch for full details.

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T. utilis under suboptimal aeration followed by anaerobic growth conditions.

The foam form can be made to revert to normal *T. utilis* type by several aerations, growth on solid media, and then anaerobic culture. New cultures should be adapted to straw hydrolyzates in anaerobic culture, followed by gradually increased aeration.—*Brauwissenschaft*, 61-65, 90-95, 124-26, 150-53, April-July, 1954.

Spoilage of Stored Rice

Rough rice (18-19% moisture) stored in sealed glass-lined steel bins, undergoes changes in microbial population marked by an inhibition of mold growth and a considerable increase in yeasts.

In a 262 bbl. lot of Rexoro rice stored for 7 months in such a bin, species of *Endomycopsis*, *Hansenula* and *Pichia* were found. In a similar lot of 360 bbl. of Zenith rice species of *Endomycopsis*, *Candida*, *Oespora* and *Hansenula* were isolated. All were capable of withstanding anaerobic conditions and temperatures of 102 F.

They were found chiefly on the surface, the extra moisture necessary for their growth being due to translocation from other parts of the bin. These yeasts by their growth can affect the carbohydrates and bran oil of rough rice and induce off odors and flavors. Souring of the silage type can also occur.—*Applied Microbiology*, Vol. 2, No. 4, 215-20, 1954.

Pilot Plant For Batch Solvent Extraction

At SRRL in New Orleans, an all stainless-steel batch solvent-extraction pilot plant has been designed, constructed, and tested.

It features an improved batch extractor, a high-velocity rising-film type evaporator, vacuum and auxiliary equipment, pneumatic control, and mechanical recording instrumentation. Plant is located outdoors to minimize dangers arising from the use of certain solvents. It is designed in accordance with the ASME Code for Unfired Pressure Vessels, and can be operated by one man.

Extractors are of 3.5 and 5.0 cu. ft. capacity, which past experience has shown ample for extraction of small lots of materials. Capacities of solvent and miscella tanks are 150 and 35 gal., respectively.

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In Master Type D Unibrakes, dynamic braking is obtained with a unique, patented brake winding superimposed on the stator winding of any Master single phase or polyphase AC induction motor. This provides dynamic braking for AC motors with no outside source of DC current required.

ADVANTAGES. Type D, Dynamic Unibrakes are very simple and compact, and as the brake has no moving parts, there is nothing to wear . . . nothing to adjust . . . braking torque remains uniform.

SIZES. Now available up to 30 horsepower . . . larger ratings are being developed. Master Gearmotors and variable speed drives can also be supplied with Type D Unibrakes.

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Type M Unibrakes have electro-magnetic brakes of the friction disc type built into a continuation of the motor end cover, on the end opposite the regular shaft projection. Electric brake and motor form a compact, integral unit.

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This superbly carved and inlaid shield is a product of skillful 16th Century armor-making. Its dimensions and balance permit easy handling. The intricate carving and embossment reveal it as a masterpiece of sculpture. And most important of all, the sturdy construction and careful design gave maximum protection to the warrior who carried it in battle.

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solvent and miscella systems. Equipment and piping are insulated with either standard or double-standard thickness magnesia on hot surfaces, and brine-thickness cork on cold surfaces.

Performance has been tested with five test runs. In runs Nos. 2 and 3 lipide extraction efficiencies were 97.3% and 97.1%, respectively. In runs Nos. 4 and 5 free gossypol was reduced in the marc by extraction with butanone to 0.01%, and total gossypol to 0.1% and 0.19%, respectively. Material and equipment cost of plant was $15,511, installation, $6,512.— *Journal of the American Oil Chemists' Society*, 338-41, July-Aug., 1954.

Air Filtering Materials

Sterile air in large amounts for microbiological processes is probably most often produced by filtration through porous materials.

Suitability of the materials may be tested by forcing known amounts of air, contaminated by test organisms, through a measured thickness, and determining number of organisms that pass through the filter after a given length of time.

With *Bacillus subtilis* morphotype *globigii* as test organism at the rate of 20,000 cells per liter of air, 3-in. layers of cotton, slag wool, and glass wool had break-through times of 4, 2, and 3 hr. respectively. Three in. of activated carbon, 10x20 mesh, passed bacteria after 2 hr., a period increased to 5 hr. for finer, 30x50 mesh. Laboratory filter paper lasted 3 hr. before letting bacteria through, while the most effective bacterial filter was an asbestos-cellulose sheet that, in some experiments, held back bacteria for as long as 190 hr.—*Applied Microbiology*, Vol. 2, No. 4, 240-42, 1954.

Metal Inactivator For Edible Oils

In carboxymethylmercapto succinic acid, investigators have found a new compound of high activity for stabilizing edible oils. It has two carboxyl groups, alpha to the sulfur atom and one carboxyl group in the beta position. This arrangement is ideal for formation of chelate rings and the complexing of iron.

The molecule has one more carboxyl group than is needed for complexing the iron, and it has been shown that this group can be esterified to achieve oil solubility, and that the compound will still retain good metal-scavenging properties.

Laboratory and pilot-plant investi-

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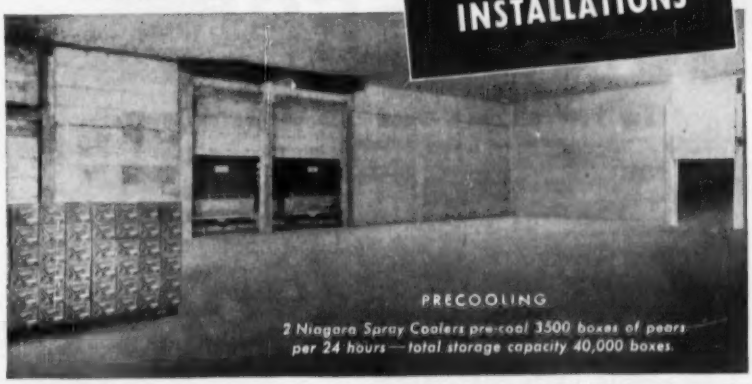

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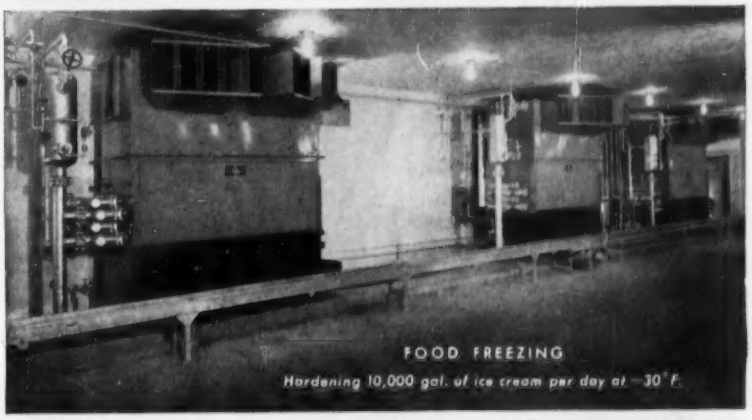

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Hardening 10,000 gal. of ice cream per day at −30° F.

FROZEN FOOD STORAGE

Room 80 ft. x 135 ft.—Temperature −5° F.

NIAGARA "No-Frost" gives you extra capacity and better operation. It improves quality, especially in foods, where it brings the product to correct temperature faster and holds it without fluctuation. It saves money for you in the cost of power and labor. With Niagara "No-Frost" there is never any "de-frosting" loss of time or temperature rise.

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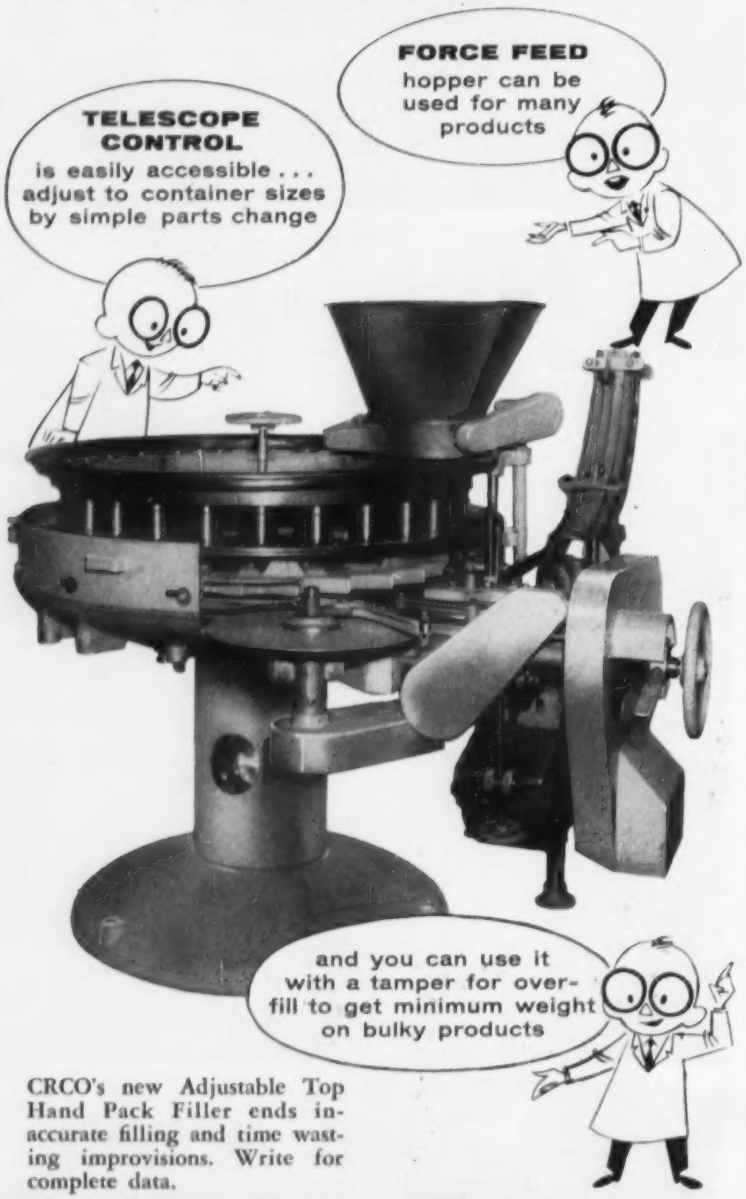
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FOR THE FOOD PROCESSOR

Food Engineering Reports
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In Keeping Up With Field . . . . page 193

gations were made of the effectiveness of this acid in stabilizing liquid and hydrogenated soybean and cottonseed oils. Addition of 0.01% on the warming-up and cooling-down side of deodorization showed no stabilizing effect in the former case, but a marked improvement in stability in the latter, below 100 C.

Most tests were carried out at the 0.01% level for easy comparison with other inactivators, although the mercapto product seemed equally effective at concentrations as low as 0.0025%. Effectiveness was confimed by both chemical and organoleptic tests, the latter showing significant improvement in the initial flavor and flavor stability of oils and shortenings treated.

The compound and its derivatives may find use in salad oils, vitamin preparations, drugs and similar products where good trace metal-inactivating properties are required. A serious disadvantage lies in the compound's thermal instability, and the possibility of developing a mercaptan odor and taste in oils subjected to a high temperature—*Journal of the American Oil Chemists' Society*, Vol. 31, 9-12, Jan. 1954.

Water Treatment and Use In Food Processing

In a general review of use of water in food processing plants, author points out that hard water is objectionable, not only for boiler supply, but also for brine, syrup, and all canning purposes.

Calcium and magnesium salts in the water will harden certain vegetables, especially peas and beans, calcium having the greater effect. Hard water has a pronounced hardening effect on peas in the blanching operation, particularly when done in wire baskets suspended in tanks.

Some hardening is noticeable even in continuous blanching with hard water. The effect of calcium and magnesium compounds on dry beans is even greater than on peas, and it may be advantageous to soften water when its hardness exceeds 200 ppm.

Calcium and magnesium compounds in hard water may combine with the soluble oxalates in beets to form a white coating on their surface.

Volume of water required in food preparation varies with product and

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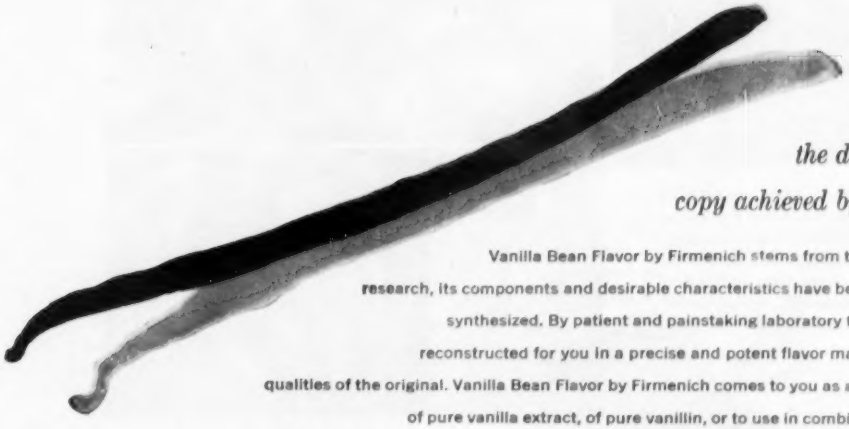
imitation vanilla bean flavor by Firmenich



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Vanilla Bean Flavor by Firmenich stems from the vanilla bean. By original research, its components and desirable characteristics have been isolated, identified, and synthesized. By patient and painstaking laboratory techniques, they have been reconstructed for you in a precise and potent flavor material with all the aromatic qualities of the original. Vanilla Bean Flavor by Firmenich comes to you as an economical replacement of pure vanilla extract, of pure vanillin, or to use in combination, in the manufacture of all products that you flavor with this most popular of flavors.

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Page & Shaw simplifies checking of 24 critical plant temperatures

. . . with compact, centralized Foxboro system

Compact, cabinet-mounted Foxboro Segmental Chart Recorder and Selector Switch Unit centralize room temperature measurements in compressor room at Daggett Chocolate Co., Cambridge, Mass. Typical of critical areas measured are packing room (top right) and storage room (lower right). Sensitive, wall-mounted Dynatherm bulbs detect room temperatures.

Keeping a close watch on temperatures of 24 widespread storage and production rooms doesn't require any "legwork" at Daggett Chocolate Co. A Foxboro Segmental Chart Recorder "makes the rounds" automatically . . . logs each temperature every half hour.

The Recorder, installed in the compressor room, gives the refrigeration engineer a complete 24 hr. temperature "picture" on a single, circular chart. In addition, a selector switch unit permits him to spot check any room manually in seconds. Besides saving countless hours of inspection tours, the centralized system *continuously* insures protection of candy freshness and finish from bloom or sweating.

Foxboro Centralized Recording Systems are simplifying temperature and humidity measurements throughout the food industry . . . providing more compact, highly legible records for quality control. Write for complete information on this modern method.

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method of preparation. Washing consumes the largest quantity; hence the operation should be as efficient as possible.

Overloaded rotary washers are ineffective in cleaning the product. Spray washers, either rotary or horizontal conveyor, depend for efficiency on pressure and volume of water, and distance of spray nozzles from the product. A small volume of water sprayed under heavy pressure is more effective than a large volume under low pressure—*Food Processing, Packaging, Marketing*, 66-67, Feb. 1954.

Continuous Fermentation

Production of beer continuously, from grinding of malt to filling of bottles, has not yet been realized, but a continuous fermentation and ripening process has been installed and operated on an experimental scale.

It is made possible by use of highly clarified wort filtered through diatomaceous earth. Maturation of the beer is hastened by washing with purified CO_2 recovered from the fermentations. Wort is added to the system daily where it is mixed with the youngest fermenting beer. Any air-borne organisms are quickly suppressed, the small amount of air is rapidly used up, and a vigorous fermentation ensues.

A large experimental installation has operated continuously for 10 months, receiving 4.25 bbl. wort each day and delivering the same quantity of completely fermented and matured beer.

Installation consists of 6 tanks, 40, 30, 20, 15, 15, and 15 hectoliters capacity each, all operating as a closed fermentation and storage system, with each held at appropriate temperatures and pressures for their particular function. Fermentation starts in tank No. 1, continues in 2 and 3. Tanks 4 and 5 are for storage, matured beer being delivered from 5 to 6—a surge and operating tank from which beer is taken for filtering and finishing.

Wort enters tank 1 from top where it starts to ferment, then flows to 2 and 3 through bottom connections. In latter tank fermentation is completed and a relatively clear beer is delivered from the top to tank 4, where it falls through an atmosphere of CO_2 which was collected from the preceding tanks and purified. Carbon dioxide purge is repeated in tank 6.

Advantages claimed for system are, rapid clarification and maturing, reduced danger of infection, improved colloid stability, uniform quality through constant yeast condition and blending. Also filter output is increased—(Versuchs- u. Untersuchungsstation fürdie Gärungsindustrie, Mülheim/Ruhr, Germany), *Brauwelt*, No. 44, 624-626, June 1, 1954.

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Plate Units Satisfactory For Beer Pasteurization

Beer pasteurization in heat exchangers of the plate type is entirely feasible and has been carried out successfully in at least three Norwegian breweries.

Hansa Brewery, Bergen, uses a pasteurizing time of 27 sec. at 154.4 F. Total time in the pasteurizer, including time to heat and to cool is 2½ min.

Regenerative heating and cooling are used, with a heat recovery of 94%. Steam consumption is 3.1 lb per bbl. of beer compared to 62 lb./bbl. for bottle pasteurization. Refrigeration requirements of 163 Btu/bbl. just about offset the electrical power of the bottle pasteurizer. There is no bottle breakage with consequent losses, and no pasteurized odor or taste develops.

Plate-pasteurized beer may be bottled without further storage, though a pressure surge tank is usually interposed between pasteurizer and filling machine. If rigid cleaning and disinfection schedules are maintained, and care is taken to fill sterile bottles, or only those without organisms that flourish in beer, the biological stability is quite adequate—*Beretning om det. 10 Skandinaviske Bryggeriteknisk*e Mode i Kobenhavn 79-91, Jan. 1954, (in Norwegian).

—End—

Low-Lactose Concentrate

—Continued from page 69

ture (111 F.) conversions. Rate of hydrolysis was about the same as that shown in Fig. 2 for the condensed product of lower solids. Resulting milk powders were of good appearance and stability.

Lactose of sweetened condensed milk may also be hydrolyzed, but the rate of reaction is considerably slower. Sweetened condensed skim milk treated with 0.67% Lactase B (based on lactose content) gave 8, 18, 24, and 30% hydrolysis after storage for 1, 3, 4, and 6 months at 40 F.

Such storage conditions conform closely to those customarily used in plant practice, and slight adjustments of concentration of lactase, temperature, and time of storage would permit utilization of this process in plants operating on a somewhat different schedule.

Pilot and Plant Tests

Most of our pilot and plant scale tests were carried out on skim milk concentrates by addition of 1% of the enzyme Lactase B (based on the weight of lactose). It was made into a premix of one part enzyme powder with three to four parts skim milk concentrate. This was added to the bulk of the product and thoroughly mixed with a paddle-type agitator or Lightnin mixer. When stored for periods of 7-10 days at 35-38 F., about 5% of the lactose was hydrolyzed per day.

In other tests, 1% enzyme-treated skim milk concentrates were stored 4 to 6 days at 35-38 F. This resulted in 20-30% of the lactose being hydrolized.

For larger processing plants, a shorter treating period at higher temperatures may be preferable. At 111 F., for instance, 1% enzyme (based on weight of lactose) will hydrolyze about 15% of the lactose in 2 hr. and 26% in 4 hr. (see Fig. 2).

It is apparent that there is no need for special equipment to carry out the conversion in different dairy substrates. But sufficient tank space must be available to hold the product during treatment. For example, skim milk concentrates must be held for 2-4 hr. at 100-120 F. or for several days in the cool room.

Use in Ice Cream

First tests with the lactase-hydrolyzed skim milk concentrates were designed to demonstrate absence of sandiness in ice cream even at very high concentration of solids-not-fat in the mix. It was shown that 16% solids-not-fat could be used safely in an ice cream without any sign of lactose crystallization after cabinet storage for 4 months if about 50% of the lactose in the concentrated skim had been hydrolyzed.

In practice it is rarely desirable to increase levels to more than 13.5-14.5% in ice cream having 10-12% butterfat, so only 20%-30% of the lactose present need be hydrolyzed.

A number of pilot plant and plant tests were carried out with 10-12% butterfat mixes using hydrolyzed skim milk concentrates as the source of solids-not-fat. In these trials, level of solids-not-fat varied from 13 to 15%. In each instance, texture of the ice cream was considerably improved. At equivalent amounts of over-run—usually 90-95%—body of the ice cream was heavier and chewier, and it seemed to have a richer taste, than products containing 10.5-11% solids-not-fat.

It was found desirable to reduce the concentration of sucrose by about 1% to compensate for the lowered melting point of the higher solids ice cream and for the increase in sweetness. In each instance ice cream was stored

THE YORK ADVERTISEMENT on the following two pages is the first appearance in this magazine of a new information series on York Refrigeration Equipment and its uses.

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NEW facts for your files on York "Hi-Fin" Coils for

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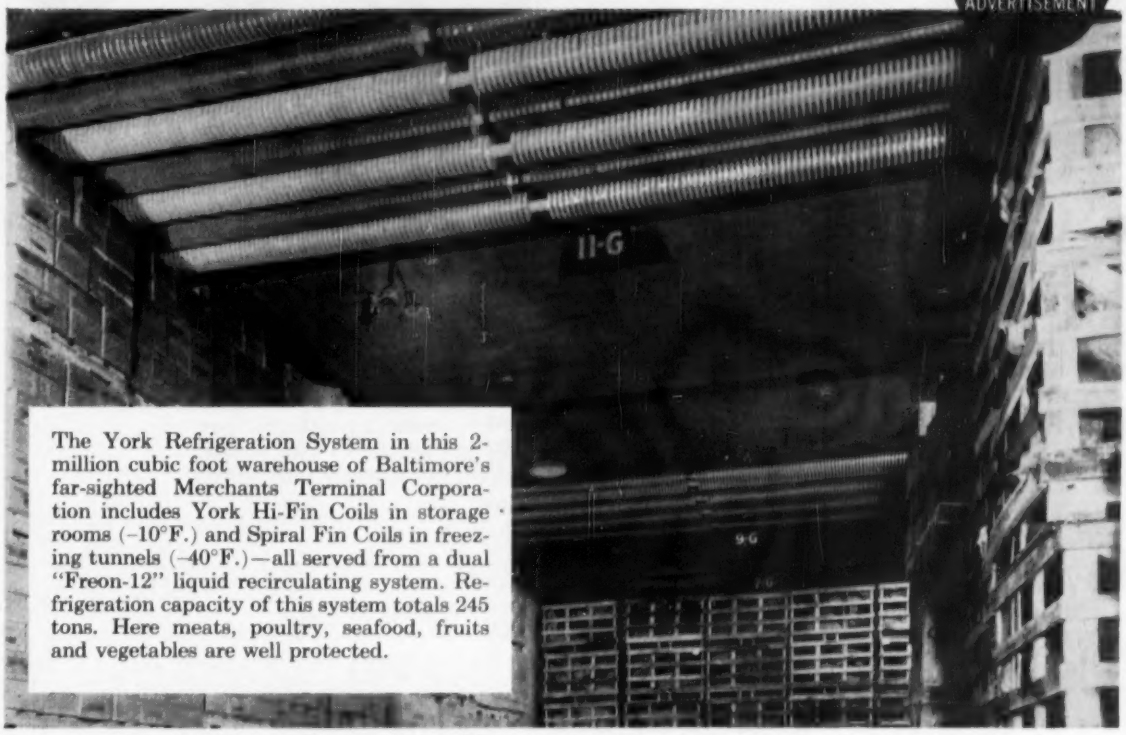

The York Refrigeration System in this 2-million cubic foot warehouse of Baltimore's far-sighted Merchants Terminal Corporation includes York Hi-Fin Coils in storage rooms (–10°F.) and Spiral Fin Coils in freezing tunnels (–40°F.)—all served from a dual "Freon-12" liquid recirculating system. Refrigeration capacity of this system totals 245 tons. Here meats, poultry, seafood, fruits and vegetables are well protected.

TEMPERATURES GOING DOWN—and direct expansion refrigeration is gaining popularity. York Hi-Fin Coils are *designed* for this purpose.

LOAD GOING UP—equipment must deliver more cooling for the space it takes up. York Hi-Fin Coils have 7½ *times* greater capacity than equal lengths of 2" bare pipe coil.

LESS DEFROSTING WITH CEILING-HUNG FINNED COILS—only once or twice a year. The unique construction of York Hi-Fin Coils gives *easier* defrosting, too. Frost drops free without dripping.

NO FANS NEEDED—York Hi-Fin Coils create air movement *without fans*. This feature alone represents a considerable saving, because it eliminates the operating cost of fans *plus* the operating cost of the extra cooling capacity needed to remove the fan heat from the storage rooms.

DEFROSTING WITHOUT MOVING PRODUCT—when York Hi-Fin Coils are installed one pipe high *only over the aisles*, they provide required cooling. When defrosting your storage rooms, product *need not be moved!*

ENGINEERING SERVICE—York's vast experience in the freezing and storage of foods is part of a *complete* York service available to your design engineer.

Some Helpful Hints for Warehousemen

1. Include hydraulically operated "floating platforms" in your loading docks. These can be quickly brought to the level of each truck's bed—even adjusted as the bed moves up or down during unloading and loading.

2. Another method is to build your loading platform with a slight incline. Then each truck can find a spot flush with its own bed. Number the "stalls" and each truck can find its spot readily.

3. Air conditioning and radiant heat in your vestibules cut door maintenance, speed up traffic and reduce accidents because ice, fog and frost otherwise encountered are eliminated.

A.I.A. FILE NO. 32-A

OVER

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YORK HI-FIN COILS

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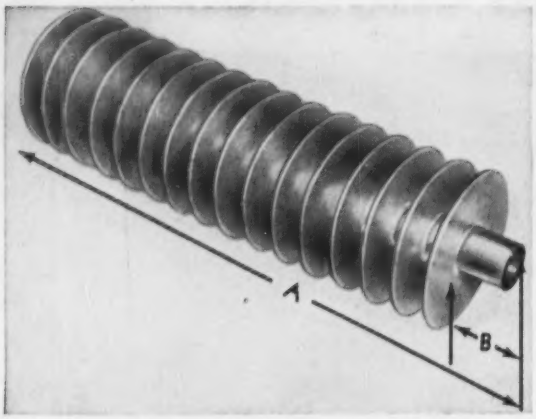
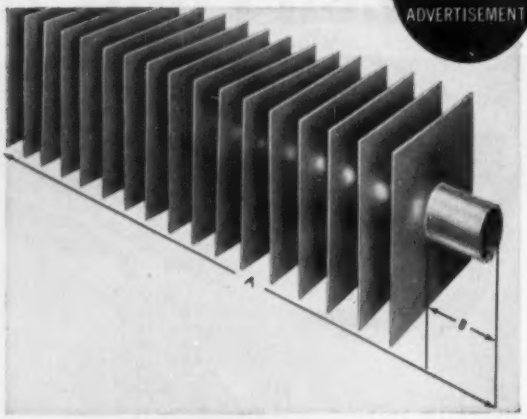


YORK HI-FIN COIL—ROUND FINS.



YORK HI-FIN COIL—SQUARE FINS.

York Hi-Fin Coils provide a number of important advantages, particularly in direct expansion refrigeration applications. The greater surface area per unit of length and the high heat transfer rate permit a highly compact and economical installation.

DIMENSIONS

COIL LENGTH ("A") both square and round fins	5'0"	6'8"	10'0"	20'0"
DIMENSION "B" read each figure with corresponding "A" figure above	3"	3½"	3"	3"

7" square Fins; 7½" Round Fins; Fin Spacing, ¾" or 1½".

PRINCIPAL FEATURES

LARGE COOLING SURFACE—7½ times greater capacity than equal length of 2" bare pipe.

HIGH HEAT TRANSFER EFFICIENCY—each tube is joined to every fin under high-pressure tension bond.

EASY MAINTENANCE—no moving parts.

INSTALLATION FLEXIBILITY—sections can be closed off to provide efficient operation with light loads.

OPERATION

Flooded or pump recirculation feeding of refrigerant is recommended. Sections can be closed off to balance system when the coil is set up so that it can be operated with reduced compressor capacity. Coil banks normally require only one pipe high, providing easy hot-gas defrosting, using discharge gas from the compressor.

SPECIFICATIONS—STANDARD UNIT

TUBES—2" OD, 13 gauge, electric welded, black steel.

FINS—7½" OD round or 7" square, 12 gauge, black steel discs spaced on ¾" or 1½" centers.

FINISH—Coils are furnished either hot-dip galvanized or Ferrocote. Galvanized coils are recommended for applications above 32° F.

VALVES AND FITTINGS—York Valves and Fittings are known for *positive seal* and are made in over 6000 sizes and types from ¼" to 14". They are available for all Hi-Fin installations.

YORK CORPORATION

the quality name in air conditioning and refrigeration

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

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in cabinets for periods up to four months with no indication of sandiness. Positive controls, with equivalent levels of solids-not-fat in which lactose had not been hydrolyzed, showed sandiness within 2-4 weeks.

Increasing the level of skim milk solids from 11-13% will add slightly to raw-material cost of the mix formula. However, a saving can be made by decreasing the amount of stabilizer and by a reduction of about 1% in sucrose.

Another important benefit should be realized in the ability of ice cream having higher levels of skim-milk-solids to better withstand the usual hardening, transportation, and storage treatment.

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End (Resume reading on page 70)

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Questions & Answers

THIS MONTH'S PROBLEM

Batter-Consistency Varies

Question—Does anyone make an inexpensive viscosimeter for automatically measuring and controlling consistency of a batter mix? Employed in our shrimp-breading operation is a batter prepared by blending 2 parts of water with 1 of batter mix, and we would like to maintain its consistency so that a uniform amount of batter will always coat the shrimp. But we run into trouble—our batter consistency changing every few minutes because of ice water melting from the shrimp.

NOVEMBER PROBLEM

Trouble Cleaning Boiler

The Question Was—Our water-tube boiler has been in practically continuous service for some 20 yr. We have always practiced feed water-chemical treatment, and have endeavored to keep the tube inner surfaces clean by periodic use of mechanical tube cleaners. However, on recent internal examination, it was discovered that there is a thin, but very hard, scale on many tubes. Is this serious and, if so, can you suggest how it could be removed?

Answer—The question of how serious the scale may be really depends upon how much it cuts down heat transfer in your boiler. While you may not have noted any reduction in capacity or efficiency, it is, nevertheless, true that such films will act as partial insulators and may permit metal in the tubes to reach higher temperatures than desirable for safe operation. For this reason, boiler inspectors watch for such deposits and recommend their removal when they become too thick.

As to method of removal, you imply that regular mechanical tube cleaning does not remove the scale. So, chemical treatment appears necessary. The scale is, of course, a mineral deposit, and the usual treatment is to dissolve it out with acids.

There is always danger of undesirable corrosion of exposed metal surfaces of the boiler in such "acidizing". Therefore, it is general practice to add an inhibitor to the acid solution. All in all, we recommend that the cleaning job be turned over to one of the specialized firms with the "know-how" to do it properly and safely.

Not only will this cleaning restore the heat transfer practically to original value, but there is also another advantage: Removal of scale sometimes shows up pin-hole leaks, repair of which avoids later tube failures.

Preparing Potato Salad

Question—Along with our precooked potato operation, we are considering using the slivers to prepare a potato salad for retail distribution in 12-oz. waxed containers. Therefore, we would appreciate your advice on the practicability of this product, best type of salad dressing and other seasoning that might be used, and also the manner of cooking the potatoes. We wonder too what the expected shelf-life would be under average store conditions.

Answer—Frankly, we are a little dubious about the practicability of this product, for two reasons. One is that the slivers you mention might be too small to make an attractive salad. We believe that most homemakers are used to good-sized potato cubes and would expect them in a commercial product. Second reason is the high degree of perishability of a product packed in a waxed container and, therefore, not heat-sterilized.

However, you might still be able to handle the product under the proper conditions. Therefore, we suggest you consider a mayonnaise-type dressing if the economics warrant it, as it is richer in oil than a starch-base dressing. The later could be used if you were anxious to keep your costs to an absolute minimum. You can obtain formulas for dressings from the manufacturers of salad oils.

A seasoning customarily used for potato salad is onion, which might be added in fresh minced form, or as juice. Diced celery is another common ingredient. Mustard, too, would liven the flavor.

As to cooking the small potato fragments, our suggestion is to handle them in wire mesh or perforated metal baskets, which could be immersed in kettles of water and boiled. Because of their small size, cooking would take little time, and it would be necessary to control this operation with care to avoid over-cooking. We see no reason why steam cooking would not work also, and this would have the added advantage of reducing weight losses to some extent.

We would expect shelf-life to be not more than two days, and it would be highly advisable to keep it under refrigeration throughout this entire period. This is on the basis that health department officials regard salads as perishable, and numerous cases of food poisoning have been attributed to them. Thus, you can see that the product you visualize would be a delicatessen item for immediate consumption in your own locality.

If this does not fit into your situation, we might suggest that you consider producing the potato salad as a canned product. We understand that it has been successfully canned, and undoubtedly you could obtain details on process time and temperature, as well as on type of can linings needed, etc. from any one of the can companies which maintain technical service organizations.

Hazards With Aerosols

Question—Are there hazards in the use of insecticides in aerosol form? If so, can you suggest any precautions to reduce them?

Answer—Hazards from aerosols may be classed as those of explosion, flammability, and toxicity. Type of solvent used in the aerosol is, however, of primary importance. Unfortunately, the less toxic solvents seem to present the greater explosion hazard, while the safer ones from the explosion standpoint are apt to be toxic.

There have been instances of explosions where light solvents—xylene—or oils were used in fogging machines. While ordinary dosages are well below the explosive limit of concentration, over-doses can take place in small confined area, followed by explosion if an open flame or spark happens to be present.

A suggested precaution is to mix, in suitable proportions, a non-explosive solvent with the explosive one. Certain government tests have shown that at least a 50-50 mixture is necessary to

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prevent explosion hazard, with as much as 75% being considered. One such non-explosive solvent is perchlorethylene (also known as tetrachlorethylene). Another solvent is carbon tetrachloride.

Use of perchlorethylene for 75% of the solvent, for normal aerosol dosages, may create a toxic concentration in excess of the recommended safe concentration for continuous exposure. It is, therefore, important that the fogging-machine operator should be familiar with the symptoms of overexposure—irritation of eyes, nose, and throat; coughing; sleepiness; abdominal cramps; and nausea.

As a safety precaution, he should be provided with an approved type of canister gas mask. And he should immediately leave the area if the chloroform or ether-like odor of perchlorethylene becomes noticeable.

New Plastic Film

Question—We package a certain amount of food in flexible films, such as cellophane and polyethylene. Recently, we have heard that there is a new synthetic plastic film on the market called, we believe, a "polyester." It is supposed to have certain superior properties. Would you advise us to consider this new material as a replacement for our present packaging films?

Answer—The material you refer to is an interesting one from several standpoints. However, there does not appear to be sufficient indications that it is suitable for immediate replacement of films you are now using. One of the most striking features of the polyester film is its great tensile strength. Another is its excellent dielectric properties. Most applications so far seem to have rested upon these physical properties, which are of greater value to certain electrical and mechanical industries than to food packaging.

This new material also has a very wide range of temperature resistance, but up until now it has not been possible to do a completely satisfactory job of heat-sealing it. This naturally limits its use, for wrapping, bagging, etc., to applications where adhesive sealing is acceptable. However, this may be overcome, as was the case with cellophane in its earlier days.

Another point is that its moisture-vapor transmission is a little greater than that of moisture-proof cellophane, although it is much more expensive than the latter. This drawback may likewise be overcome with further research.

We understand from the manufacturer that some thought has been recently given to the possible use of this material as a transparent window on the top of metal containers. Its strength and heat resistance apparently make this a technical possibility where nature of the product might be such that visibility would enhance sales appeal and justify extra cost. While this is not exactly in the line of the food packaging you mention, this application might suggest other possibilities to you.

On Making Pickles

Question—Could you furnish us with a method for making salt stock pickles from South Jersey cucumbers? We would also appreciate a formula for making a high-Baumé sweet gherkin.

Answer—Standard method for making salt stock from cucumbers is to soak them for a prolonged period in salt brine. However, there are many factors which may affect fermentation and the quality of finished stock and, perhaps, some of these will bear repeating.

To begin with, of course, certain cucumbers make better pickles than others. We do not know what variety you may be using, but we understand that among the best are Chicago Pickling, Boston Pickling, and Snows Perfection. Then, it is desirable to harvest the cucumbers when they are still slightly under-ripe, and to handle them so as to avoid bruising as much as possible. They should be placed into the brine as soon as practical, and not more than 6-8 hr. after picking.

Salt used for curing is also important. It should be free from alkalies, low in calcium, and with lime or sulphates not in excess of 0.5%. Coarse crystals are generally preferred to the fine.

About one foot of salt brine at about 40 deg. salometer should first be placed into the salting tank to prevent bruising as the cucumbers are introduced. It is advisable to weigh the cucumbers, meter sufficient water into the tank to cover the vegetables, and then add salt to bring the solution up to 40 deg. (about 1 lb. of salt per gal. is required). If possible, the solution should be at about 85 deg. F. for best results. A wooden cover should

---

Q.—Have you a pickling formula for quickly curing corned beef?

A.—To 100 gal. of 80-deg. Salometer brine add 15 lb. of sugar, 6 lb. of sodium nitrate, and 25 oz. of sodium nitrite.

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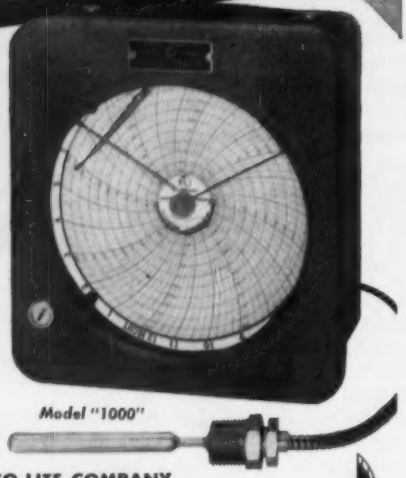

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be provided to fit into the tank and submerge the stock.

It will be necessary to add more salt each day for the first week or so, making sure that the brine is brought to a uniform concentration by recirculation or agitation each time. Altogether, salting takes about 4-6 weeks, and fermentation will bring the acidity up to about 0.6-0.8% (as lactic). Following this, the brine can be increased to 60-66 deg. salometer, and the stock can then be held almost indefinitely until ready for a subsequent processing step.

Now, as to making sweet gherkins: After the salt from salted stock has been removed by soaking and draining several times, the pickles should be soaked several days in plain vinegar of about 5.5% acidity. Next, they should be held for several weeks in spiced sweet vinegar.

There are many formulas, but here is one for spiced vinegar: Heat in a cloth bag for 1 hr. at 175-200 deg. F. in 8 gal. of distilled vinegar (8%), 1 oz. each of whole cloves, coriander, mustard seed, mace, and broken gingerroot.

Remove bag of spent spices, and make up to original 8 gal. with water. Then dissolve 10 lb. brown sugar and 10 lb. white sugar in the spiced vinegar.

After soaking in the spiced vinegar for several weeks, drain the pickles and add fresh spiced vinegar. This fresh spiced vinegar should be made up to 55 deg. Balling with added sugar.

CIP Cleaning

Question—We are interested in the possibility of reducing our cleaning time and costs by adopting the "cleaned-in-place" technique which we have heard is growing in favor in the dairy field. Could you give us some pointers to guide us in this matter?

Answer—If you now have sanitary pipe lines which you dismantle for cleaning, your first problem will be to provide the pipe joints with suitable gaskets. Suppliers of sanitary fittings are prepared to furnish fittings and gaskets (Neoprene, Hycar, or Teflon may be used) to convert your lines.

Next, you will need to provide suitable solution tanks and additional piping (hose is not generally recommended) to complete your circuit—bringing the cleaning solution back to original holding tank.

Of primary importance is provision of a pump of adequate size and power to circulate the cleaning solution at a rate of at least 5 ft. per sec. It is possible to compute the required flow in

gallons per minute to give this velocity, using the cross sectional area of the piping of known size in your system.

Once this gallonage requirement is known, the total static and friction head through the system can be estimated for the required flow-rate. Then the right size pump can be selected from the pump manufacturer's catalog data. It is generally considered better not to use a positive-displacement impeller-type pump because of the possibility of excessive wear from the solids that may be present during recirculating.

Your supplier of cleaning compounds can doubtless recommend the proper ones to use. Since the solutions are handled entirely by pump and pipeline, it is possible to use stronger chemicals and higher temperatures than are used for manual cleaning.

A further benefit is that there is no damage to pipe and fittings from repeated handling, and no danger of re-contamination after cleaning as may occur with manual dismantling and reassembly.

Has Floor Problem

Question—We installed a concrete floor 7 yr. ago in a new building. Lately, the floor has been crumbling and cracking, and all attempts to resurface it have been unsuccessful. Our floor supports a variety of processes, with such units as a baking oven, fish-frying vats, food peeling and cutting machines, filling machines, and a great number of caster-mounted racks (constantly being moved from place to place). What's more, a major part of the floor is almost constantly under water. Have you any suggestions on how we can fix our floor?

Answer — Conditions your floor must withstand are so varied that it is likely no one solution would be perfectly satisfactory from performance and cost standpoints. Part of your trouble may be due to subjecting the concrete to conditions which it was never meant to withstand. Another factor may be failure to adequately control the initial construction. And so it is difficult to make hard and fast recommendations that will completely correct your difficulties.

Another consideration is the manner in which attempts to resurface the floor have been carried out. Sometimes the pressure to get repairs completed

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A.—Between 35 and 40% should produce a desirable product.

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and resume production is so great that the proper procedures cannot be followed. Then the attempts are almost certain to prove disappointing.

As we analyze your situation, you have chiefly three factors to contend with: (1) Chemical attack, such as may be caused by fats from frying operations; (2) mechanical abrasion from rack movements; and (3) water. Our sugegstions:

Where your experience clearly shows that the process ingredients have a deteriorating effect upon the existing concrete, we would suggest replacement with either packing-house brick or quarry tile with acid-and-alkali resisting joints. Initial cost is rather high. But such flooring, properly installed, will entail practically no maintenance problems thereafter.

If floor-load capacity of your building will permit, such flooring could be laid on top of the present floor, with ramps to allow for the difference in elevations.

It seems likely that the racks you mention are moved over fairly definite paths between stages of process. If aisle areas of heavy traffic do exist, these could be protected by cutting out a sufficient amount of the crumbled and cracking concrete, and setting in metal grids or embossed metal plates with new concrete. This is a common way of taking care of heavy traffic conditions in plants such as yours.

Alternate treatment would involve cutting out the faulty area, as above, and re-installing a special surface, making use of emery or metallic materials for a portion of the aggregate. This will produce a floor with exceptional wearing qualities.

In speaking of cutting out faulty areas, it is well to keep in mind that the cutting should be to a depth of at least 1 in. and the edges should always be cut sharp and straight vertically. The area to be re-surfaced should then be well roughened to permit a good bond between new and old concrete.

One final suggestion: You might consider changing the casters on your racks. If they are of steel, you might materially cut down on floor wear by switching to rubber- or plastic-composition casters. It might be cheaper and more convenient to replace these, as necessary, than to maintain the floor surface.

It really should not be necessary to have the major part of your floor almost constantly under water. We recommend a topping having suitable slopes to selected points where floor drains can be installed. This should also pay extra dividends by reducing accident hazards and improving sanitation.

Operation Simplified

—*Continued from page 78*

ones arriving on a chute descending from the second-floor case make-up room.

Filled cases are then automatically glued and sealed, now ready for either direct loading into trucks or temporary storing on the first and ground floors.

Handling of filled cases at this point has been arranged so that any truck can be loaded with a variety of packages from storage—and without any need to move the vehicle from dock location, at which it was unloaded. What this required was storing all different size packages from the two canning and seven bottling lines alongside each first and ground-floor conveyor.

Now let us follow the flow of filled cases from third floor to truckloading dock and to first and ground-floor storage. Cases from the nine filling lines descend by booster belts to the second floor, where they converge into three lines for still another descent to the first floor.

The Merry Go-'Round

On this floor, the three lines feed into a triple-tier merry-go-'round, comprising belts and rollers.

Purpose of this equipment is to direct cases from any of the nine filling lines to the points of desired storage. Cases from any of the three tiers are diverted onto any of the seven lines running the length of the first-floor storage area. Those cases not moved to the first floor can continue to ground-floor storage or go directly onto trucks. As needed, cases stored on either floor are loaded onto the same conveyor that brought them in, and so move to the loading area.

Selective case traffic is achieved by the use of bars held within metal frames and set across the merry-go-'round feed-off conveyors. Positioned at desired heights, they permit smaller cases to pass under while diverting taller ones so that they continue to the specific feed-off conveyor having a bar at a height allowing its passage.

Further, the merry-go-'round is equipped with bars at the points where each tier converges into a single line running the length of the first floor. As on lines described earlier, these bars prevent cases from colliding.

Space is provided along conveyors on the first and ground floors for storing 400,000 cases. And via each outgoing line some 500 cases are truck-loaded hourly.

End (*Resume reading on page 78*)

Cold-Room Doors

—*Continued from page 75*

temporarily stored along the corridor. Thus, both docks are uncluttered and free for full use.

Two main cold storage areas are on either side of the central corridor. Temperature in each is held at −5 deg. F. On one side there is one huge freezer storage room 260 x 202-ft. in area. On the opposite side of the corridor is a large cold storage room 202 x 146-ft. and two small freezer compartments 116 x 116-ft., and 116 x 86-ft. All of the above described chambers are 20 ft. high.

Inside one of the large freezer rooms are two quick-freezing tunnels which receive all incoming fresh merchandise. These operate at −40 deg. F., and each has a daily capacity of 120,000 lb.

Accurate refrigeration temperatures are maintained constantly throughout the plant. Cork insulation is used for all cold storage facilities. Temperature readings can be made at any time from a network of thermocouples in the main freezer rooms, quick-freeze tunnels, and break-down rooms. And readings can be taken at various control panels.

A continuous log is maintained of temperatures in the different cold storage areas. Operating temperatures are recorded every 32 min. at each location. Simply by pushing the station button for any area, it is possible to check the temperature of the air in that area, of the concrete sub-floor and of the oil circulating in the sub-floor ventilation system.

Frost heavage is prevented by a continuously operated sub-floor pipe grid system. Oil at 50 deg. F. temperature is circulated through more than 5 miles of 1-in. pipe under both main freezer areas.

Altogether there are 14 individual refrigerated rooms used by packers, brokers, shippers, distributors and customers of Merchants Terminal. The four main storage areas which have been described are freezer chambers. There are two cooler storage rooms 56 ft. wide by 17 ft. high kept at 32 deg. F. One is 146 ft. long and the other 56 ft. long.

Then there are eight 36-ft.-square break-up rooms near the truck platform end of the plant. These rooms, kept at 0 deg. F. or + 32 deg. F. as required, provide space for tenants to store and break up large shipments into smaller units for re-shipping or delivery.

In addition, there are several air-conditioned offices for lease to tenants, a general office, and a cafeteria.

End (*Resume reading on page 75*)

IF YOU USE STAINLESS OR HIGH ALLOY TUBING

this new booklet was written for you...

Whether you're an engineer who wants technical information in a hurry, or a new user of tubing looking for the full story of stainless and high-alloys, you'll find this booklet equally valuable.

In it, discussed by classification, you'll find data on pressure, sanitary, mechanical, heat-resistant, ornamental and other forms of stainless and high-alloy welded tubing. There are engineering data on joining methods, welding techniques, bending and installation hints. Also included are complete tables of bursting pressures, physical and chemical properties of stainless steels and other alloys, and corrosion and temperature data. This is only a partial list of contents, but it will give you an idea of the wealth of pertinent, factual information the booklet contains.

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Useful New Books

And Government Publications

Progress in Food Research

ADVANCES IN FOOD RESEARCH. *VOL V. Edited by E. M. Mrak and G. F. Stewart. Published by Academic Press Inc., 125 E. 23d St., New York 10. 1954. 538 pages. 9¼x6¼ in., cloth. Price:* $11.50.

Another in a series designed to promote scientific progress in foods and nutrition, this work contains work by foremost authorities in the food research field.

Seven sections are included in this volume. These cover oxidative rancidity and discoloration in meat, sugar-sulfite reaction and its relationship to food problems, pretreatment and preservation of fruit and vegetable products with sulphur dioxide and sulfites, statistical methods in food research, flavonoid compounds in foods, the color problem in foods, and composition of wines.

The book is indexed by author and subject.

Management Reports

Of interest to food industry management are two booklets recently published by the Research Division, California Personnel Management Association, Berkley, Calif. Price for either is $1.00.

HOW A COMPANY CAN DEVELOP UNION RESPONSIBILITY. *Report No. 206. A stenographic brief of an address given before by Herbert O. Eby, Labor Relations Director, Pittsburgh Plate Glass Co.*

FOREMEN AND SUPERVISORS ON THE MANAGEMENT TEAM. *Report No. 203. A stenographic brief of a panel report on what happens when management skills are entrusted to foremen and supervisors.*

Progress in Materials

MATERIALS FOR PRODUCT DEVELOPMENT, 1954. *Published by Clapp & Poliak, Inc., 341 Madison Ave., New York 17. 1954. 160 pages. 6¼x9¼ in., cloth. Price:* $7.50.

Some of the more common of the many problems confronting the product designer are discussed in this work. Among these are materials of the future, non-metallic materials, corrosion protection, and materials management.

Material for the book was derived from papers presented at the Basic Materials Conference in Chicago, 1954.

The book is illustrated and supplemented with charts and tables.

Chemicals for Commerce

SUCCESSFUL COMMERCIAL CHEMICAL DEVELOPMENT. *Edited by H. M. Corley. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 1954. 374 pages. 6 x 9¼ in., cloth. Price:* $7.75.

Prepared under the auspices of the Commercial Chemical Development Association, this book offers information on the theory and practice of new product development in the chemical and allied fields.

Purpose of the book is to clarify the important principles of every step in selecting promising new chemicals and rapidly developing them to the stage of economic importance. Though intended primarily for the chemical field, these steps are applicable in other fields, particularly in the production of food.

Book indexed, and each chapter is followed by a complete list of references.

Reports and Pamphlets

PRACTICAL REFRACTOMETRY. *Published by R. P. Cargille Laboratories, Inc., New York City. 76 pages.* $1.00. A text on the determination of indices of refraction of solids by microscopical methods.

BUTYLATED HYDROXYTOLUENE. *Bulletin No. 18. Published by American Meat Institute Foundation, Chicago 37. 20 pages, paper. No charge.* Collection of extensive test data on a new antioxidant for food use.

COMMERCIAL STORAGE OF FRUITS, VEGETABLES, AND FLORIST AND NURSERY STOCKS. *Published by USDA, Washington, D. C. No charge.* Brief summaries cover the storage requirements of fruits, vegetables, and other products.

LOW TEMPERATURE TEST METHODS AND STANDARDS FOR CONTAINERS. *Published by Advisory Board on Quartermaster Research and Development, Washington, D. C. No charge.* Report on a symposium sponsored by the Quartermaster Food and Container Institute.

REPORT OF THE 39TH NATIONAL CONFERENCE ON WEIGHTS AND MEASURES, 1954. *Published by U.S. Dept. of Commerce, Washington, D. C. Price:* $.50. Addresses and reports delivered before the Conference. Included is data on prepackaged foods, and packaged flour weights.

FE REPRINTS AVAILABLE

Listed below are special sections, flowsheet book, and articles from past issues of FOOD ENGINEERING which are available in reprint form. Single-copy prices are listed. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon. inside the back cover. You will be billed when your order is filled.

1. Meat Special $1.25

Contains a series of 9 articles: (1) Cold Sterilization Problems. (2) New Continuous Lard Process. (3) Progress in Meat Dehydration. (4) High-Speed Chub Packaging. (5) Atomic Irradiator Designed. (6) Improvements in Unit Tasks. (7) New Processes for Old Products. (8) Map Unravels Delivery Snags. (9) Saves 50% of Retort Steam.

2. Dairy Special $1.25

Ten timely articles are included: (1) Dairymen Face Challenging Changes. (2) New Processes for Instant Dry Milk. (3) Controls Presage Automatic Dairy (4) Save With Cleaned-in-Place Pipes. (5) Bi-Oxidation Solves Waste Problem. (6) Cheese Keeps in Antimycotic Wrap. (7) Plastic Tank for Milk Trailers. (8) Bulk Handling Aids Processors, Too. (9) Advanced Dry Milk Flowsheet. (10) "Tracers" Detect Foreign Fats.

3. Ingredient Special $1.25

Ten articles helpful in improving product formulation: (1) Chemicals Still a Question. (2) Role of Antioxidants. (3) MSG —Unique Enhnacer. (4) Tailored Salts Add Values. (5) Ascorbic Acid Betters Meats. (6) Dry Solubles Are Versatile. (7) Sugar Types and Uses. (8) Latest on Low Calories. (9) True-Fruit Hows and Whys. (10) Stepping Up Nutrition.

4. Packaging Special $1.25

Six articles of practical value: (1) Flexibles Are Revamping Packaging Pattern. (2) How To Avoid Damage in Shipping. (3) Bundling Frozen Foods. (4) One-Portion Packets. (5) Automatic Packaging Line. (6) Paper Vs. Glass.

5. Canning Special $1.25

Eight articles on significant developments: (1) High Frequency Looms as Improved Cooking Method. (2) New Twist in High-Short Retorting. (3) Full-Flavor Concentrates by New Recovery Technique. (4) From Orchard to Cannery—Under Water. (5) At Gerber's, Quality Control Reigns Supreme. (6) Bulk Brining Spells Big Benefits to Canner. (7) Top-Notch Tomato Processing Opertaion. (8) Dual Tomato Cannery—How It Ticks.

6. Book of Flowsheets $2.00

Few copies of 1949 edition still available. It contains 130 process charts covering a wide variety of food manufacturing operations. Charts are accompanied by brief descriptions of the processes.

7. Preventive Maintenance $0.50

An 8-pager packed with information that will help to minimize costs, reduce down-time, and promote quality through more effective maintenance.

If you want to lose business, and do without,

Use Strawberry Flavor

whose taste fades out.

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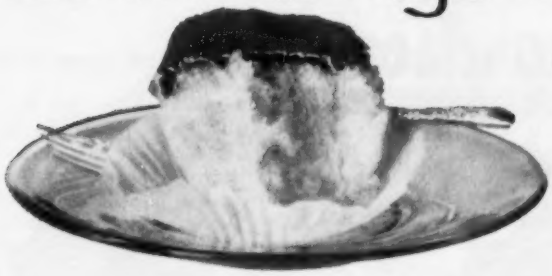
So... always come to NORDA



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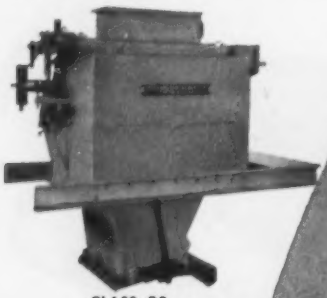
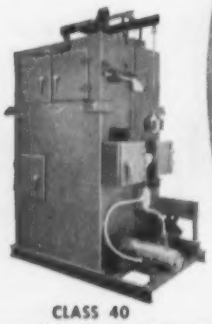
what can WE do for YOU Mr. Processor?

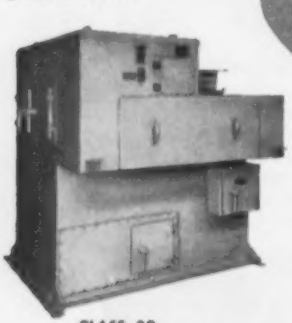
CLASS 50
Dust-tight, all-electric, high-speed, accuracy-indicating scale for weighing dry, ground, granular, dusty, non-free-flowing and some small lumpy materials. Bulletin 3649.



CLASS 38
Dust-tight, heavy-duty scale for dry, ground, dusty, non-free-flowing materials. Bulletin 8946.



CLASS 40
Accommodates screw, belt, or vibrating feeder for handling wide range of materials. Dust-tight, solenoid- or motor-operated discharge, accuracy-indicating. Bulletin 1449.



CLASS 39
Self-contained, dust-tight, belt-feeding and weighing unit. Accuracy-indicating for process or intermittent batch weighing of lumpy, crushed, sluggish materials. Bulletin 1549.

Frankly, that's the reason we're running this ad—not to tell you about our products, but to ask you about your plant problems. Because if your business involves the handling of any materials or liquids by weight, we think you probably have an operation or two which just doesn't measure up in efficiency, economy, or speed. We'd like to know about it, because we think we can help.

You can call it pride, or conceit, or self-satisfaction, or self-confidence, but our engineers have never been stumped for long by a problem in materials-handling by weight—and in fifty years of working with the biggest names in American industry we've seen a lot of them! From aluminum sulphate, to zinc oxide, and back to almonds we've successfully installed Richardson units or systems to handle just about everything in the book, and built a lot of goodwill and a fair-size company in the process.

CONTROL PANEL
Richardson-designed panels such as this control whole automatic weighing systems composed of scales like those at the left.

Naturally, if a Richardson Scale can contribute to the smoother, faster, or more profitable operation of your plant, we'd like to sell you one. We think that our products and experience can help in solving your problem in processing, and if you'll outline it, we'll be glad to have one of our field engineers arrange to go over it with you.

Or, if you'd just like to know more about Richardson Scales for possible future reference, simply clip this ad to your signed letterhead and mail. Bulletins 0450, 0550, and 0351 will be sent you by return mail—no obligation.

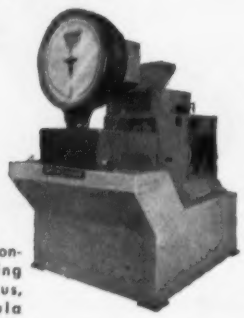
The Richardson Scale Company, Clifton, N. J., will be glad to supply information on:

Feeder-Weigher Systems • Automatic Bulk Weighing Hopper Scales • Automatic Bagging Scales • Bag Sewing Conveyors Packers • Process Control Panels and Select-O-Weigh

Please write direct to our Clifton office, or to the nearest of our branch offices located in Atlanta, Boston, Buffalo, Chicago, Detroit, Houston, Memphis, Minneapolis, New York, Omaha, Philadelphia, Pittsburgh, San Francisco, Wichita, Montreal, Toronto, Havana, Mexico City, San Juan.

Richardson
MATERIALS HANDLING BY WEIGHT SINCE 1902

CLASS 56
Self-checking, automatic feeder-weigher for large tonnage; practically continuous stream delivery. Beam system has approval of all weighing authorities. Bulletin 2140-2.



SELECT-O-WEIGH
On electronic weight control system providing remote, instantaneous, dial-control formula changing and ingredient selection for all proportioning applications. Bulletin 0351.

8360

KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

A-Men Aid Food Field

Now set to serve the food industry in a radiation-consultant capacity is a special group of seven atomic scientists. Under the name Radiation Applications Inc. (342 Madison Ave., N. Y. C.), the new organization will conduct research, survey areas of utilization, and recommend specific radiation applications.

Experts participating: Dr. V. L. Parsegian, Prof. Nuclear Eng., Rensselaer Polytechnic Institute; Dr. J. S. Butts, Head, Dept. of Agr. Chem., Oregon State College; Drs. E. J. Henley and E. L. Gaden, Jr., Dept. of Chem. Eng., Columbia U.; E. Sargent, Chem. Engr., Formerly Cleveland Area Manager, AEC.; B. Manowitz, Engr. in Charge, Fission Products Utilization Project; and Dr. W. R. Singleton, Senior Geneticist, Brookhaven National Laboratory.

Sugar Quota Holds Prices

The 1955 sugar quota for the U. S. has been set at 8,200,000 tons by USDA Secretary Benson. This compares with the initial quota for '54 of 8,000,000 tons, which was raised to 8,250,000 tons by the end of the year.

Meaning of the new quota is that sugar prices will remain about where they are, or go only slightly higher. Stocks are down, and consumption indications appear the same as '54 or a bit higher.

It has been the custom to set initial quotas below estimated consumption, and the new-year quota was set accordingly. This keeps sugar prices up and aids producers (in contrast to refiners and users).

Improves Baking

A new concentrate formula for baking—achieving bread and other yeast-raised products that score higher, have improved physical properties, and better taste and aroma—has been announced by American Dry Milk Institute, Chicago.

Formula is result of exhaustive commercial test of ADMI's stable ferment process, introduced last summer. It's said to enable precise control over finished dough temperature; to permit using constant volume of ferment, regardless of flour absorption; and to effect further economies of equipment.

Expect Hot Tussle on Additive Issue; How Congress Groups Shape Up

The year 1955 will go down as the year of the big food additive battle. In fact, it is only in this sphere that any substantial food law legislation can be expected from the 84th Congress.

► **Controversy around the subject, however, makes it likely that no final agreement will come before the 84th's second session, in 1956.**

If such an additive bill is passed, it will complement a measure passed in 1954—the Miller Pesticide Amendment that set up procedures for establishing *unintentional* food additive tolerances. The battle of '55 will be over coverage of *intentional* additives.

Sharp differences of opinions on this subject don't help its chances of ultimate passage. But at least it's sure that the controversy will get public airing.

Certainly three, and perhaps as many as five, bills covering additives will be introduced in Congress this year. Compromise between the varied interests is unlikely until after the House Interstate & Foreign Commerce Committee holds hearings on the subject. Agreement following hearings among the various segments of the food and chemical industries, lawyers specializing in the field, and the Food & Drug Administration should assure formal passage in 1956.

Agreement—And Disagreement

Actually, there is only a very small area of disagreement. No one disputes these points:

(1) Use of food additives has improved foods; (2) any additive, whether synthetic or natural, should be fully tested for safety; (3) all data on toxicological testing should go to FDA; and (4) FDA should view such data with regard to the level at which the additive is to be used.

Argument concerns the modus operandi: Whether FDA, after being notified that a company wants to market an additive and after receiving all safety test data of the company, must then give its formal approval before marketing—or whether, after informal conferences with FDA, a manufacturer may go ahead and market unless FDA takes him to court.

There are good arguments behind

63-Yr.-Old Can of Corn—And Still Good!

Sealed way back in 1891, this old-style hole-and-cap type can containing sugar corn bears witness to the high performance of metal-can packing. It was opened and tasted at a recent ceremony of the N. Y. State Canners & Freezers Assn., Rochester. And the contents were found "a creamy white without any discoloration or unpleasant odor, and there was no gas in the can," according to T. P. Cobb, district sales manager of American Can Co. Ginna & Co., N.Y.C., made the can, and it was packed by Fredonia Canning & Mfg. Co. of Fredonia, a subsidiary of Ft. Stanwix Canning Co., Rome, N. Y. Right photo: Susan Olney, 13, spoons a sample to her grandfather, W. R. Olney, 80, who had kept can since '90's, when he was employed by the Ft. Stanwix concern.

De-Salting Ion Exchange Increases Sugar Juice

A pilot plant for de-salting sugar juices through ion exchange membranes with the aid of electric current will be installed on Maui, Hawaiian Islands, it is announced.

As applied here, the de-mineralizing involves partial removal of salts such as potassium chloride, thus enabling increased recovery of sugar.

Dr. J. H. Payne, principal technologist, Hawaiian Sugar Planters' Assn. Experiment Station, said the plant will be built at the Puunene factory of Hawaiian Commercial & Sugar Co. Operations are to be carried on cooperatively by HSPA and HC&S.

Application to cane sugar juices was conducted in cooperation with Godchaux Sugar Co. of Louisiana at the laboratories of Ionics, Inc., Cambridge, Mass. The technique further is seen as a possible means of de-salting sea water.

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both points of view. On one side, you hear this:

Prime responsibility for food quality and safety lies with the food manufacturer, not with the company that makes a food additive. The only way for a food manufacturer to be sure an additive is safe is for FDA to approve it, prior to use.

Such approval is now needed before an additive can be used in such foods as white bread, mayonnaise, ketchup—on which FDA sets Standards of Identity. And no less rigid criteria should be used for foods that are not subject to FDA Identity Standards.

Judging from the FDA's record under the new-drug law, those who say that prior review and approval will put a great limitation on research are not facing facts.

Differing Viewpoint

Then there is this other side:

Progressive manufacturers who believe quality and usefulness of foods can—and should—be improved recognize a joint responsibility for safety between the additive maker and the food manufacturer. Prime responsibility for safety of a manufacturer's product should remain with him, not be shifted to a Government agency.

It must be noted that any agency that has the major responsibility for products of hundreds of manufacturers is prone to make timid, nonscientific decisions—or arbitrary ones that go beyond the scope of public health and safety, discouraging further research on food additives.

The Food & Drug Laws are traditionally ones of policing—industry is told the rules and is expected to live by them. Full disclosure of all safety tests conducted, submitted before introduction of the additive, gives FDA all the evidence and time it needs as policeman to take any manufacturer to court.

Three Groups Active

Within the framework of these differences, you can now locate three groups. One is headed by Congressman James Delaney and the former counsel of his investigating committee, Vincent Kleinfeld. The latter has been revising a measure, specifying FDA additive approval, that Delaney introduced into Congress last session. There is not believed to be any significant support for this measure.

The first major group—which includes many lard manufacturers, meat, milling, dairy, and bakery members—had two versions of its legislative ideas introduced in Congress last year by Rep. James O'Hara. This body is the leading exponent of the concept of prior approval for new food additives.

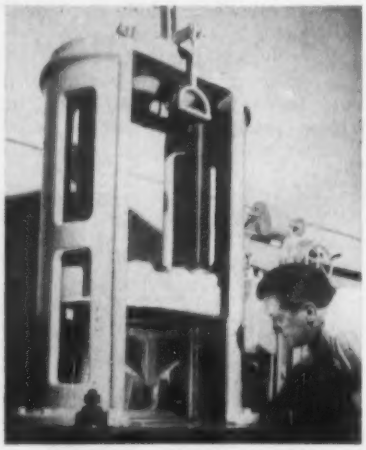
Representatives of this group have been revising its bill to meet some of the criticisms in the minds of those who drafted it, and complaints levelled against it at a meeting last August of the American Bar Assn.'s Food, Drug & Cosmetic Law Section. No changes in over-all legal philosophy are involved.

The other major group is certainly not as well defined. It also includes many food manufacturers, and—as secondary partners — chemical companies which make food additives.

The chemical companies, working through the Manufacturing Chemists' Assn., have felt that the initiative for drafting legislation should come from the food industry. And they have preferred to remain passive until some other group makes a firm legislative proposal which they feel they can accept. They firmly believe FDA should police, not license, food additive products.

Further, there are several persons who, as private citizens or as legislators with general interests in food and drug legislation, are preparing bills. None of these would seem to have a chance, unless the two major groups are unable to reconcile their differences.

It will take concentration on a single legislative bill to get any new food additive measure enacted into law.



Tough-Plus Coating

So completely is nickel bonded to base metal in American Locomotive Co.'s Alcoplate process that it doesn't flake or chip even when the piece is forcibly buckled (photo). The chemically-plated nickel is termed hard (about 49 Rockwell C); nonporous in thicknesses as little as 0.01 in.; and generally more corrosion-resistant than either pure or wrought nickel. Hence, use on food equipment invites investigation. Reportedly, coating is effective regardless of base piece's irregularity. Method is an adaptation of General American Transportation Corp.'s Kanigen process in which a covering of 93% nickel and 7% phosphorus is deposited.

Odor Curbed, Meal Better

Elimination of offensive odors, also pollution of streams, in areas adjacent to packing houses and fish meal plants is one benefit seen won by a new process developed by two University of Illinois scientists, Ezra Levin and R. K. Finn.

The new technique is stated to completely contain the odors while also improving meal flavor.

In the process, wet, fat-containing organic tissue is ground and suspended in a water-immiscible fat solvent, such as ethylene dichloride or trichloroethylene. Water is removed by distillation, while fat is simultaneously dissolved and recovered separately.

Solids are dried at a temperature that assures no loss or destruction of biological values. Being fat-free, they are mild in flavor and completely stable in storage.

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3 Pest Conferences

Measures against insects and rodents, with accent on sanitation, will be spotlighted in three regional conferences of pest control operators: At Purdue U., West Lafayette, Ind., Jan. 31-Feb. 4; at Louisiana State U., Baton Rouge, Jan. 31-Feb. 2; and at U. of Massachusetts, Amherst, Feb. 3-5. Sponsor is National Pest Control Assn., New York City.

MM Buys Snow Crop

Big news of the month in the frozen food field was purchase of Snow Crop Div. of Clinton Foods, Inc., by Minute Maid Corp.

The addition provides the latter with a complete line of frozen fruit, vegetables, fish, and poultry items.

Said President Fox of MM: "This gives us the broad base of diversification long felt desirable for continued healthy growth and progress of our company.

"Meanwhile," he went on, "we are planning no major changes in Snow Crop's operating or sales personnel, nor in its distribution channels, it being our hope that housewives will continue their loyalty to Snow Crop products, which have the same reputation for high quality as our own Minute Maid brand."

Hors d'Oeuvres

▶ **At a School Science Fair and Career Conference in New York, hundreds of technically-minded youngsters attended 19 guidance clinics. These ranged from rocket engineering to nursing—but none on food. Probably too well fed to think of food.**

▶ Quite different from a young Norwegian chemical engineer we know. He survived on potatoes fried in whale blubber during World War II. Now he's an inspired teacher of food engineering in this country.

▶ **Down South they have barbecue flavored potato chips and chili corn curls to add spice to the variety of eating.**

▶ And a Wisconsin lawyer has a new frozen milk creation. He adds non-fat dry milk to cream and freezes the slush. But it has to be beaten to reconstitute it with water. And there's no market for new inconvenient food items.

▶ **Popular at the Scottish Industries Exhibition was a smooth and warming drink concocted from oatmeal, honey, cream, and whiskey. Apparently you can't spoil a good whiskey.**

▶ Americans are eating 16% more fat than 40 years ago, says the Department of Agriculture. Well, it is generally conceded that we are living off the fat of the land.

▶ **An importer reports that the sale of whale tenderloin increased from 8,000 lb. in 1953 to 20,000 lb. in the first 10 months of 1954. Must be comforting to old Jonah—people swallowing so much whale.**

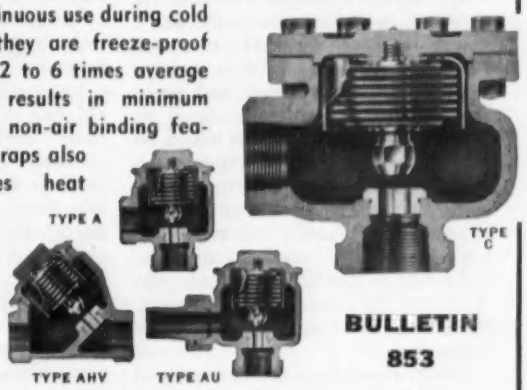
▶ In the wake of the fish-stick boom comes a frozen chicken stick with a croquette-like composition. There would seem to be almost no limit to foods that can be produced in the latter form. You can do almost anything with a comminuter.

NICHOLSON MAKES

Freeze-Proof Steam Traps

for every Plant Use

Because they drain completely when cold, these four types of Nicholson steam traps are positively freeze-proof. Can be freely installed outdoors. Universally recommended for use in lines which need not be in continuous use during cold weather, because they are freeze-proof and because their 2 to 6 times average drainage capacity results in minimum heat-up time. The non-air binding feature of Nicholson traps also notably facilitates heat transfer in severe weather. Types for every plant use. Sizes ¼" to 2"; pressures to 300 lbs.



BULLETIN 853

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TRAPS · VALVES · FLOATS

STEEL for greater endurance

FLEXIBLE for smoother operation

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Chemicals on Tongue Test People's Tastes

"Bitter-Salty" Persons (Easily Pleased) Contrast With "Bitter-Bitter" Individuals (Hard to Please)

New way of typing people on their likes and dislikes in foods employs the four groupings "bitter-salty," "bitter-bitter," "tasteless-salty," and "bitter-sweet."

It involves a unique chemical-test approach which might well prove practical for use by food processors. For it indicates that 75% of humans fall into these four groups, and hence the food maker might run checks on his products by a panel on which all four kinds of testers are represented.

A liking for sauerkraut, turnips, spinach, and strong cheese blankets the field and generally indicates a person's liking for all foods—putting the individual in the bitter-salty category. And after the chemical testing, a person's favor for foods readily may be forecast.

According to the formula, developed by Dr. Arthur L. Fox, director of research, Colgate-Palmolive Co., Jersey City, and described in a recent issue of Collier's, a man's taste type is revealed by placing on his tongue in succession two chemicals—phenylthio-carbamide (commonly known as PTC) and sodium benzoate. People find PTC either bitter or tasteless, while they describe sodium benzoate as bitter, salty, sour, sweet, or tasteless.

In tests of 1,062 individuals, Dr. Fox found that three out of four people can be put in one of the four combinations. His investigations, over years, indicated that 70% of white Americans find PTC decidedly bitter, 30% find it tasteless. The figures vary with other races and nationalities. Inability to taste PTC then was found by geneticists to be caused by a single recessive gene passed from generation to generation.

Later, while working with Du Pont, Dr. Fox discovered the varying reactions to the second chemical, sodium benzoate. The bitter (PTC)-salty (sodium benzoate) group, thus distinguished, likes almost all foods. The bitter-bitter type dislikes most foods or has no real opinion about them. And the tasteless-salty and bitter-sweet people fit somewhere in between.

In summary, Dr. Fox finds it definitely demonstrable that a food will taste one way to one person, another way to a second. In short, actual tastes really vary a great deal, and so reactions can be more than whims or habit.

Further foreseen is the possibility of simplifying eating problems when serving large numbers of people, such as in the army. Here there might be employed a more satisfying "double menu" wherein a great variety of food would be prepared for the bitter-salties while more bland-tasting dishes would be served to the bitter-bitters.

World Food Shorts

New sanitizing facility for meat trucks is now in action at Central Animal Market, Vienna. Outlay for it was $104,000. Trucks are cleaned and sprayed with formalin before taking on new loads for delivery.

Plywood barrels and kegs are cheaper, last longer, and hold food liquids better than oak types, claims a Soviet agency. Plant in Vienna makes the new containers with inner layers of inferior wood and with oak used only for two surface layers. Staves are glued with phenolformaldehyde.

Corn yield up 70% per acre by virtue of a single spraying with hormone weed killer is reported by Potchefstroom College of Agriculture, South Africa. Chemical effects adverse to young plants are thus thought to be curbed.

H. J. Heinz Co., Ltd. will erect a new $7 million dollar plant on a 130-acre site at Kitt Green, England. Eventually, full company product line will be turned out at this facility.

Food storage units are in wide expansion in Brazil, with construction about to be launched on 45 new warehouses and with more planned for future.

Fruit Exports Supported

Shipments to foreign countries of fresh and processed oranges and grapefruit now are being encouraged by USDA through payment by the Department to exporters and members of the citrus industry of 75¢ per box for oranges and 60¢ per box for grapefruit.

Eligible countries include principal western European countries. Shippers, however, are cautioned not to conclude any export agreements until receiving from USDA copies of new terms covering changes from previous export programs.

New overseas demand derives from last February's freeze damage in Spain and other European areas. Total '54 orange and tangerine crop in Spain, Italy, Israel, and N. Africa is put at 70 million boxes, down 18 million from '53.

Flakes Make "Mashed"

Newly reported by USDA researchers are potato flakes—dehydrated spuds in a form that readily can be converted to mashed potatoes simply by adding hot water or milk.

Processing involves drying cooked mashed potatoes on the rolls of a steam-heated double-drum dryer.

Commercial development must await completion of storage tests and cost estimates. Meanwhile, preliminary reports indicate the process should be economical because the drying equipment is widely available, little labor is required, and this application of steam is efficient.

A free copy of the report (Research Service Circular ARS-73-2) may be obtained from the Agricultural Research Service, USDA, Washington 25, D. C.

Map Khapra Quarantine

Continuing spread of khapra, grain-destroying beetle from the Far East (FE Feb. '54, p. 199), led last month to a special USDA hearing in Denver.

As a result, federal quarantine measures are now likely.

A potent threat to millers, as well as to producers and handlers of grain, and even other products, the beetle has already been identified in some 70 storage facilities in California, Arizona, and New Mexico. The larvae get into wood, thus are spread by trucks and boxcars.

Conventional insecticides have not proved wholly effective in curbing the insect. Millers' National Federation is distributing printed data on the pest to its members.

Dairy-Course Roundup

Short courses and conferences are slated at the following state universities and colleges during the next two months:

U. of Maryland—Ice Cream Short Course, Jan. 17-27; Ice Cream Conf., Jan. 27. . .U. of Mass.—Ice Cream Short Course, Jan. 24-Feb. 4. . .Ohio State U.—Dairy Tech Conf., Feb. 8-11; Milk Sanitarians Short Course, Mar. 14-18. . .Oregon Dairy Ind. Assn.—Conf. & Short Course, Feb. 14-17. . .Penn State—Ice Cream Conf., Jan. 21; Market Milk & Milk Supervision Short Course, Jan. 24-Feb. 5.

Purdue—10-day short courses: Cottage Cheese & Buttermilk, Jan. 17-28; Tech Control of Dairy Products, Jan. 31-Feb. 11; Ice Cream & Sherbets, Feb. 14-25. . .Rutgers—Market Milk Course, Feb. 7-18. . .Tex. A & M—Dairy Mfgrs. Conf., Mar. 16-17. . .Wis. Dairy Mfgrs.—Annual Conf., Mar. 29-30.

Briefly . . .

• PROCESSING AT SEA of fish has been so successful on British trawler "Fairtry" that other vessels of same type are planned by owners. English consumers say product "never tasted better."

• MARGARINE consumption is seen totaling 8 lb. per capita for '54, up a tenth of a pound over '53. Thus butter, currently running at 9 lb., now holds only a slim per-capita advantage.

• SAFE DRIVING for a whopping total of 550,000 miles has won a large handsome trophy for George Robbins, salesman for Miller Brewing Co., Milwaukee.

• SAUSAGE CONSUMPTION will run to 4,000,000,000 lb. annually by 1956 forecasts E. E. Ellies, sales v.-p. of Transparent Package Co., Chicago.

• CENTURY TOMATO, newly announced by P. J. Ritter Co., Bridgeton, N. J., is aimed to fill need for an earlier variety of better color, higher vitamin C content, and more rich meat.

• NUTRITION RESEARCH will be furthered in new laboratory just opened by Swift & Company, Chicago. Facility covers some 4,000 sq. ft. and is fully air conditioned.

• CANNING PLANT OUTPUT per man-hour has risen some 50% over the last decade, according to E. E. Willkie, president of National Canners Assn.

• ARTIFICIAL SWEETENERS, like saccharine and Sucaryl, have enjoyed a big acceleration—but still are under 1% of the total sugar-market figure.

• LOCKER PLANT operators are promoting use of the designation "Frozen Food Centers" as more closely descriptive of their businesses than the persistent term "food locker."

• ENLARGED FOOD RESEARCH center is planned by General Foods on a 55-acre site at Tarrytown, N. Y. Company has found it has outgrown present laboratory facilities at Hoboken, N. J.

• YELLOWFIN TUNA, revealed in number in the Gulf, give promise of support new fishing and canning operations along the South-Texas coast.

USDA & FDA Actions

Following are late Depatrment of Agriculture moves relative to poultry and fruits and vegetables:

Poultry. Proposed changes in USDA's voluntary inspection and grading program for poultry, discussed at regional conferences held in the spring of 1954, deal with chilling and freezing of poultry, draining of poultry prior to packaging, and lining of containers.

Grade marks are to be given more prominence. Also considered is additional protection against unauthorized use of official marks.

Quality standards for dressed and ready-to-cook poultry are to be changed, primarily in reference to Grades B and C, which would include the classifying of birds minus small amounts of skin and wing joints into those grades. Grade A specifications will remain unchanged (*Federal Register*, Dec. 10, p. 8218.)

Fruits and Vegetables. USDA Standards for frozen peas and carrots, a mix showing increasing popularity in the last few years, have been proposed, with gradings of A, B, C, and Substandard (Fancy, Extra Standard, Standard, and Substandard). Color, defects, and maturity are to be considered, with the latter the most important.

Interested persons have until Jan. 17 to submit their views to USDA, Washington 25, D. C.

Further, a marketing agreement and order regulating handling of olives in California has failed to win USDA approval, following considerable argument between canners and growers in that state.

Principal reason for the Department's opposition to the agreement, which had been proposed by the olive growers, was that insufficient support from both canners and growers made working of the order questionable.

Below are recent specific Grade and Standards actions by the Agricultural

FRICK

Equipment Freezes 18,000 Chickens Per Day

Above: View of the packaging end of the Ocoma production line.
Below: Three of the Frick refrigerating compressors at Ocoma Foods.

At the Poultry Processing Plant of the Ocoma Foods Company in Berryville, Arkansas. This recent addition to the rapidly expanding Ocoma Foods Company employs over 275 people, and incorporates all of the latest developments in production-line poultry processing.

Six Frick compressors supply the refrigeration necessary for the chilling, quick-freezing and cold storage phases of the process.

This is but one of hundreds of different applications of Frick refrigeration and air conditioning in the food industries.

When writing for literature, please describe the cooling work you have in mind.

DEPENDABLE REFRIGERATION SINCE 1853
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

Marketing Service (AMS), Agricultural Research Service (ARS), and Food & Drug Administration (FDA). References are to issues of the *Federal Register*.

Pesticide Chemicals, usefulness certification (ARS), *F. R.* Nov. 24, p. 7585.

Shell Eggs, grading and inspection, and U. S. Standards, Grades, and Weight Classes (AMS), *F. R.* Nov 25, p. 7607.

Cheeses, Processed, Cheese Foods, Cheese Spreads, proposed amendment to Standards of Identity (FDA), *F. R.* Nov. 27, p. 7695.

Strawberries, Frozen, U. S. Standards for Grades (AMS), *F. R.* Dec. 14, p. 8538.

Schedule of Events

January '55

18–20—National Macaroni Mfrs. Assn.; Hotel Flamingo, Miami Beach, Fla.
18–20—Annual Workshop for Food Processors; U. of Maryland, College Park.
24–26—National Dairy Council, mid-winter conference; La Salle Hotel, Chicago.
24–27—American Management Assn., general management conference; Hotel Statler, Los Angeles.
24–27—National Potato Chip Institute, annual conference; Sherman Hotel, Chicago.
24–27—Plant Maintenance & Engineering Conference (24-26) and Show (24-27); International Amphitheatre and Palmer House, respectively, Chicago.
27—Dairy Products Improvement Institute, annual meeting; Hotel Commodore, New York City.
31–F3—United Fresh Fruit & Vegetable Assn.; Hotel Commodore, New York City.

February

2—Eastern Frosted Foods Assn.; Belmont-Plaza Hotel, New York City.
3–4—Western Frozen Food Processors Assn.; Hotel Senator, Sacramento, Calif.
5–20—Package Designers Council, 1955 Packaging Competition, exhibit and presentation of awards; American Institute of Graphic Arts, N. Y. C.
6–8—Tri-State Bakers Assn.; Jung Hotel, New Orleans.
7–8—Grain Processing Machinery Mfrs. Assn.; Edgewater Beach Hotel, Chicago.
11–13—Institute of American Poultry Industries, annual conference; Kansas City, Mo.
14–16—American Management Assn., personnel conference; Palmer House, Chicago.
15–18—Western States Meat Packers Assn., annual meeting; Palace Hotel, San Francisco.
16—National Red Cherry Institute, annual meeting; Morrison Hotel, Chicago.
18—National Pickle Packers Assn., winter meeting; Drake Hotel, Chicago.
19–23—National Canners Assn., National Food Brokers, Canning Machinery & Supplies Assn., overall convention and annual meetings; Conrad Hilton Hotel, Chicago.
28–M4—American Bottlers of Carbonated Beverages, plant training course; Bellevue Hotel, San Francisco.

Instrument System

—*Continued from page 67*

pilot lights on the floor plans. This instrument consists of a small electric time-clock motor, driving a synchronized, horizontal drum. Unrolled from this drum is a graphic chart with horizontal and vertical lines.

The equi-spaced horizontal lines represent hourly intervals, and hours are numbered on the centers of the lines. Between the hour lines are finer lines for 15-min. periods. Each vertical line, on the other hand, is numbered to represent a machine. Width of chart depends on number of machines that must be checked.

If more details on operation of machines are required, charts can be printed with wider spacings between the horizontal hour lines. And the instrument can then be synchronized by adjusting two small gears between clock motor and drum drive shaft.

About the Hook-Up

From motor starter on all machines —and from starter load side—electric wires are brought into a panel box (Fig. 5). Wires here are numbered to correspond with those of each machine. Each wire then extends to one side of a relay, and there is a corresponding ground connection.

Thus, every time a motor starts, its corresponding relay is energized to close the circuit in two low-voltage (25v.) wires that are hooked up to the electric panel. From a 115v. line on this panel, current is transmitted to the electric time-clock motor driving the chronograph drum and also to a transformer that reduces the voltage to 25. Every day except Saturday and Sunday, the time clock is set to start the system at 6:00 A.M. and then to stop it at 6:00 P.M.

Interposed between clock and transformer are two signal lights (red and green). Through an electric relay, these lights indicate whether current is being supplied to the transformer. Further provided is a switch to manually shut off the current. And there's also a fuse to protect against overloading and damaging the transformer.

From the low side of the transformer, and through a manual switch, a low-voltage (25-v.) line is supplied to the electric panel. One pole on this line is hooked up to one side of all of the double-pole double-throw switches, while the other is connected to one of the two contacts of the relays inside the electric box. An electric wire is extended from opposite relay contact to the opposite side of the d-p d-t switch.

In this way, as soon as a machine starts in the production department, the corresponding relay in the electric box is energized to close the circuit of the two wires connected with the low-voltage contacts. And electric current (25v.) is then supplied to the corresponding double-pole double-throw switch.

According to the position of the switch, low-voltage current is furnished to panel signals or floor plan signals and chronograph relays.

How Recorder Operates

Within the chronograph is a series of inking-pen arms, each one corresponding to a machine-numbered, graduated, longitudinal line on the chart. And above the drum is a series of relays, each one of which, when energized, releases its pen arm to contact the chart. Pen contact on chart indicates the exact time the relay was energized and the machine was operating in the production department.

As long as the machine is running, the pen inks a line on the chart. Length of this line indicates the amount of time the machine was operating. Thus, every phase of machine operation, starting, and stopping is shown relative to time.

At the end of the day, a strip of the chart (Fig. 6) corresponding to the working hours is torn off the drum. Then, using a special ruler, the length of each line is totalized and recorded at the end of the chart. Adding and recording the running time of 39 machines takes but 2 min.

With this record, Production now has an accurate, indisputable record of the performance of every machine. Abolished by this system are the former collections of time cards and the like, tedious calculations, loss of valuable time, and inaccuracies.

Where fractional-time starts and stops can't be recorded by the chronograph, we have hooked into the same circuit an auxiliary "policeman" in the nature of a counter.

Installation of a counter to check the enrober-cooling conveyor may be cited. Here the device totalizes the number of times the belt stops during the working day. And sometimes we even sum up the number of times belt stops within a smaller period.

We thus traced stoppages to a number of causes—such as machine breakage, faulty coating of centers, lack of raw materials or packaging supplies, insufficient help, etc.

Counters are also employed to totalize the number of cartons of assorted chocolates leaving the cellophane-overwrapping machines, with a specific tab on those rejected (poorly packaged).

End (*Resume reading on page 68*)

Recent Inventions

PRODUCTS

Insecticide Comprising Hexachlorocyclohexane Plus 1-10 Parts Trialiphatic Phosphoric Acid Ester—*J. W. Hansen, Berkeley to California Spray-Chemical Corp., Richmond, Calif. No. 2,689,201. Sept. 14, 1954.*

Catalase Stabilized With Sodium Citrate—*A. L. Lolli to Armour and Co., Chicago. No. 2,689,203. Sept. 14, 1954.*

Detergent Comprising Alkaline Salts Plus Chlorinated Trisodium Phosphate—*D. E. Anderson, Grosse Ile and W. F. Wegst to Wyandotte Chemicals Corp., Wyandotte, Mich. No. 2,689,225. Sept. 14, 1954.*

Fungi and Bacteria-Resistant Polyvinyl Halide Compositions—*J. R. Darby, Richmond Heights and E. E. Cowell to Monsanto Chemical Co., St. Louis, Mo. No. 2,689,837. Sept. 21, 1954.*

Antioxidant Comprising 2-Tert-Alkyl-4-Alkoxyphenol, Edible Oil, Non-Toxic Emulsifier—*J. A. Chenicek, Bensenville, Ill. to Universal Oil Products Co., Chicago. No. 2,690,397. Sept. 28, 1954.*

Food Product Comprising Concentrated Honey, Separately Concentrated Fruit Juice in Crystallized Form—*D. B. Bradshaw, Wendell, Idaho. No. 2,690,972. Oct. 5, 1954.*

Sugarless Beverage Containing Sodium Cyclohexylsulfamate, Soluble Cellulose Derivative, Citrus Pectin, Alkyl Silicone—*G. M. Brenner, Colfax, Iowa. No. 2,691,591. Oct. 12, 1954.*

Fat-Soluble Vitamin Dispersed Throughout Matrix of Gelatin, Water-Soluble Vinyl Resin to Form Pellet—*A. Bavley, Brooklyn, W. A. Lazier, Kew Gardens, and A. E. Timreck to Chas. Pfizer & Co., New York City. No. 2,691,619. Oct. 12, 1954.*

Detergent Comprising Alkyl Sulfuric Acid and Alkyl Amine Salts, Organic Acid—*R. D. Stayner, Berkeley to California Research Corp., San Francisco. No. 2,691,636. Oct 12, 1954.*

PROCESSES

Carbonating Drinking Water With Gaseous Combustion Products, Discharging Undissolved Gas, Controlling Acidity—*M. Epstein, Brooklyn, N.Y. No. 2,688,381. Sept. 7, 1954.*

Clarifying and Stabilizing Beer by Precipitating Tannin Complex With Polyvinyl Pyrrolidone, Filtering—*W. D. McFarlane to Canadian Breweries Ltd., Toronto, Canada. No. 2,688,550. Sept. 7, 1954.*

Treating Dark Proteinaceous Matter Surrounding White Abalone Meat With Acidic Aqueous Pepsin Solution, Separating—*M. Sahyun, Santa Barbara, Calif. No. 2,688,552. Sept. 7, 1954.*

Extending Plastic Range of Peanut Butter by Cooling Comminuted Peanuts and Stabilizer to Crystallize Fat, Heating to Fusion While Agitating—*F. L. Avera, Alameda, Calif. No. 2,688,554. Sept. 7, 1954.*

Curing Meat by Chilling, Forming Artificial Perforations, Diffusing Water-Soluble Processing Agent Through Pores, Smoking, Partially Dehydrating—*S. L. Komarik and C. L. Griffith to The Griffith Laboratories, Inc., Chicago. No. 2,688,555. Sept. 7, 1954.*

Extracting Fatty Material With Liquid Hydrocarbon, Separating Less Dense Phase, Interesterifying—*R. Miller, Pleasantville, N.Y. to The Chemical Foundation, Inc. No. 2,688,626. Sept. 7, 1954.*

Separating Egg Yolks From Surrounding Parts by Deflecting From Radial Blade Which Retains Membrane—*F. X. Russo to The Peoples' National Bank, Lynbrook, N.Y. No. 2,688,992. Sept. 14, 1954.*

Depulping Cacao Beans by Treating With Pectic Enzymes, Separating—*W. R. Johnston, Bronxville and H. E. Foote, Chappaqua to Standard Brands Inc., New York City. No. 2,689,181. Sept. 14, 1954.*

Hydrating Dates by Immersing in Water at Atmospheric Pressure in First Tank, Siphoning Fruit and Liquid Through Elevated Pipe, Discharging Below Surface of Liquid in Receiving Tank—*F. H. Richert, Fresno, Calif. No. 2,689,182. Sept. 14, 1954.*

Dispersing Vitamin A in Water-Soluble, Gelable Colloid, Casting Into Sheet Form, Drying, Freezing, Comminuting—*A. Bavley and C. J. Knuth, Brooklyn, W. A. Lazier, Kew Gardens, A. E. Timreck, New York City to Chas. Pfizer & Co., Inc., Brooklyn. No. 2,689,202. Sept. 14, 1954.*

Eliminating Weak Bottles Entering Washer by Injecting Fluid Under Pressure—*T. L. Blanton, Ventura, Calif. No. 2,689,475. Sept. 21, 1954.*

Variegating Ice Cream by Spiralling Large Core of Basic Substance Under Pressure, Introducing Smaller Core of Contrasting Flavoring Material, Compacting Composite Stream, Respiralling—*N. I. Peyton, Baltimore, Md. to Joe Lowe Corp., New York City. No. 2,689,537. Sept. 21, 1954.*

Roasting Coffee With Dispersed Carbonaceous Catalyst Having

New "PACKAGED" Double-Flow* Aquatowers

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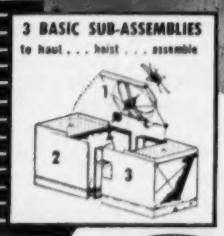

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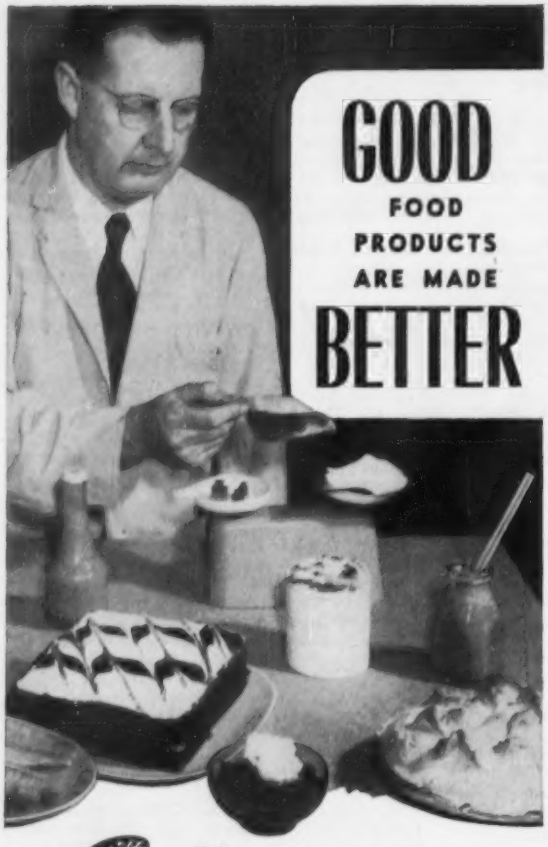

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The check list at right shows a few of the positive ways these remarkable colloids are improving dozens of items as widely varied as bakery product stabilizers, chocolate milk, dessert mixes, ice cream stabilizers, pet foods, pie fillings (fruit), puddings, sauces, sausages, and syrups.

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- Emulsifying
- Gelling
- Modifying
- Stabilizing
- Suspending
- Thickening
- Custardizing milk and products containing milk solids
- Improving mouth feel and flavor
- Increasing efficiency of component ingredients
- Modifying ice crystal growth
- Physical and anti-oxidant protection

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Send for latest SeaKem Technical Bulletins

SEAPLANT
CHEMICAL CORPORATION
63 David St., New Bedford, Massachusetts

Affinity for Vapors, Chilling, Separating Catalyst, Grinding, Adding Water—*S. Olenikov, New York City.* No. 2,689,795. Sept. 21, 1954.

Coating Food Particles by Heating Molten Candy of 3.0-6.5% Moisture to 320-350 F., Spraying —*W. F. Massmann, E. W. Michael, and W. L. Vollink, Battle Creek, Mich. to General Foods Corp., New York City.* No. 2,689,796. Sept. 21, 1954.

Improving Bread by Adding to Dough Alcohol Ester of Hydroxy Poly-Carboxylic Acid—*M. H. Joffe to The Emulsol Corp., Chicago.* No. 2,689,797. Sept. 21, 1954.

Continuously Separating Corn Starch and Gluten by Spinning Suspension in Vortex 4-30 mm. in dia., Forming Two Phases, Recovering—*H. J. Vegter, Koog aan de Zaan to Stamicarbon N. V., Heerlen, Netherlands.* No. 2,689,810. Sept. 21, 1954.

Dextran by Fermenting Acid Starch Hydrolyzate of D.E. 15-30 Plus Nitrogen Source With Acetobacter Organisms—*E. R. Kooi, La Grange, Ill. to Corn Products Refining Co., New York City.* No. 2,689,816. Sept. 21, 1954.

Skinning Sausage by Rotating to Untwist Casing, Loosening, Slitting, Separating—*V. A. Grey, Chicago to Kartridg-Pak Machine Co., Iowa.* No. 2,689,971. Sept. 28, 1954.

Shortening Prepared by Refluxing Glycerine, Higher Fatty Acids, Monohydroxy Monocarboxylic Acid at 365 F. in Vacuum With Removal of Water, Returning Acid, Sparging With Carbon Dioxide, Washing—*H. T. Iveson, Berwyn, S. B. Radlove, Chicago, and P. L. Julian, Maywood, Ill. to The Glidden Co., Cleveland, Ohio.* No. 2,690,971. Oct. 5, 1954.

Sealing Leaky Wood Barrel by Applying Layer of Sawdust Mixed in Self-Setting Cement, Overlaying With Flat Metal Grid, Applying Second Layer of Mixture—*E. P. Vollertsen, Georgetown, Ky. to National Distillers Products Corp.* No. 2,690,986. Oct. 5, 1954.

Protein Food Supplement by Milling Dried Brewers' Grains, Detaching Husk From Proteinaceous Material, Separating Chaff, Screening to 100 Mesh—*J. A. Siefker, St Louis and J. F. Brasch, Clayton to Anheuser-Busch, Inc., St. Louis, Mo.* No. 2,691,590. Oct. 12, 1954.

Malting Grain at 80 F. for 10-15 Days to Lintner Value 300-400, Dehydrating at 120-150 F., Milling, Destroying Enzymes With Liquid Chlorine—*F. F. Hansen, Pittsburgh, Pa.* No. 2,691,592. Oct. 12, 1954.

Monoglycerides Synthesized by Reacting Triglyceride Fat With Glycerol in Nitrogenous Base Solvent for Complete Conversion —*K. F. Mattil, Chicago and R. J. Sims, Evanston, Ill. to Swift & Co., Chicago.* No. 2,691,664. Oct. 12, 1954.

Deodorizing Fatty Oils by Contacting With Steam in Stripping Column—*A. E. Bailey, Louisville, Ky. to National Cylinder Gas Co., Chicago.* No. 2,691,665. Oct. 12, 1954.

EQUIPMENT

Sausage Skinning Machine With Means for Loosening, Stretching, Slitting Casing of Connected Link —*V. A. Grey, Chicago to Kartridg-Pak-Machine Co.* No. 2,686,927. Aug. 24, 1954.

Fish Tenderloining Apparatus Comprising Conveyor, Means for Gripping Exposed Belly, Severing Strip, Dislodging Entrails—*C. G. Ullin, Seattle, Wash.* No. 2,686,928. Aug. 24, 1954.

Double-Headed Commercial Ice-Cream Freezer, With Compressor, Motor, Electric Circuit, Manually Closed Switch, Automatic Cutoff —*H. F. Swenson, Seattle, Wash.* No. 2,687,019. Aug. 24, 1954.

Dewpoint Indicator Containing Wheatstone Bridge, Linear Scale Calibrated in Dewpoint Temperature—*C. C. Minter, Washington, D.C., to Minter Instrument Corp., New York City.* No. 2,687,035. Aug. 24, 1954.

Humidity Indicator Employing Hygroscopic Material, Graduated Chart Relating Appearance With Degrees of Humidity—*F. O. Anderegg, Readington Township, Hunterdon County, N. J.* No. 2,687,041. Aug. 24, 1954.

Wiener Roll Baking Pan Comprising Rectangular Receptacle, Removable Core Member, Separator Frame—*E. L. Tucker, Washington, D. C.* No. 2,687,081. Aug. 24, 1954.

Oil Extractor Having Shaft With Axial Bore, Spaced Screw Flights, Annular Plates Forming Plurality of Passages—*C. A. Bowman, Decatur, Ill.* No. 2,687,084. Aug. 24, 1954.

Citrus Juice Extractor Comprising Rotating Drums, Peripheral Fruit-Holding Depressions, Knife, Squeezing Member—*M. Koffler, Tel Aviv, Israel.* No. 2,687,085. Aug. 24, 1954.

Poultry Cleaning Device Comprising Spaced Dropping Boards, Sprocket Wheels, Continuous Pintle Chains, Scraper Blade—*M. B. Gault, Mount Pleasant, Pa.* No. 2,687,113. Aug. 24, 1954.

Can Washing Apparatus With Solution Tank, Automatic Detergent Feed, Steam Jet—*C. M. Moore, Shaker Heights to Cowles Chemical Co., Cleveland, Ohio.* No. 2,687,136. Aug. 24, 1954.

Beet Topper Comprising Frame, Cylindrical Housing, Conveyor, Cutter Shaft, Toppings Extractor

—V. G. Larsen, Picture Butte, Alberta, Canada. No. 2,687,154. Aug. 24, 1954.

Artichoke Processing Device Having Leaf Engaging, Positioning Means, Cutters for Separating Heart—V. Laurence, Menlo Park to Pratt-Low Preserving Co., Santa Clara, Calif. No. 2,687,156. Aug. 24, 1954.

Packaged Food Conveyor System With Plurality of Processing Lines, Communicating Single-File Conveyor, Transfer Means—R. M. Magnuson, Campbell and R. K. Daugherty, San Jose, Calif. to R. M. Magnuson. No. 2,687,204. Aug. 24, 1954.

Alimentary Paste Drying Tunnel Comprising Vertically-Spaced Drying Floors, Paste-Carrying Horizontal Canes, Stepwise Conveyors—A. Fava, Milan, Italy. No. 2,687,205. Aug. 24, 1954.

Fruit Orienting Device With Conveyor Having Plurality of Recesses, Vertically-Rotating Wheel, Loading Means—E. W. Carroll, Redwood City, Calif. to S & W Fine Foods Inc., San Francisco. No. 2,687,206. Aug. 24, 1954.

Egg Weigher Having Frame, Endless Conveyor, Article-Receiving Elements, Counterbalance Scales, Visual Indicator—J. W. Cox, Chicago to General Package Corp. No. 2,687,208. Aug. 24, 1954.

String Bean Grader Comprising Rotating Drum, Inner, Outer Reels, Grading Rings, Tie Bars—C. E. Kerr and M. O. Smith, Hoopeston, Ill. to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,687,212. Aug. 24, 1954.

Magnetic Sanitary Valve Comprising Inlet, Outlet Fittings, Solenoid Coil, Sleeve Body, Removable Caps—H. F. Bremer and J. A. Condolfo to Rainbows, Inc., Bronx, N. Y. No. 2,687,277. Aug. 24, 1954.

Poultry Stunner Comprising Knife Blade, Insulated Recessed Handle, Longitudinal Electrode—R. L. Coleman, Somerset, Pa. No. 2,687,550. Aug. 31, 1954.

Dough Sheeting Guide Means Having Cooperating Rollers, Conveyor Belt, Conduit, Fan—L. G. Duffy, Milwaukee, Wis. to Stickelber & Sons, Kansas City, Kan. No. 2,687,698. Aug. 31, 1954.

Fast Acting Valve Comprising Movable Valve Member, Lever Arm, Actuating Means—A. W. Sear, Syracuse, N. Y. No. 2,687,744. Aug. 31, 1954.

Potato Grader Comprising Frame, Journaled Shaft, Bin Structure, Cylinder With Hubs, Radial Spokes, Flat Ring—F. M. Jackson, Frederalsburg, Md. No. 2,687,801. Aug. 31, 1954.

Egg Grader With Plurality of Inclined Chutes, Vertically Reciprocable Elevator, Spaced Pockets, Feed Jaws, Scale Pans, Separating Means—R. S. Davis, Otsego, Mich. No. 2,687,802. Aug. 31, 1954.

Box Segregator and Stacker Having Feed, Discharge Conveyors, Vertically Reciprocating Elevator, Latch Means—E. A. Verrinder, Riverside and E. J. McGrath, Nuevo to Food Machinery & Chemical Co., San Jose, California. No. 2,687,813. Aug. 31, 1954.

Elevating Conveyor Grain Hopper Comprising Semi-Cylindrical Receiver With Central Vertical Slot, Scoop-Like Extension, Guide and Assembly Tracks, Discharge Tube—C. F. Williams, Dodge City, Kan. No. 2,687,818. Aug. 31, 1954.

Heat Exchanger Having Spaced Plates With Corrugations Forming Triangular Flow Spaces—R. P. L. Hytte, Lund, Sweden to Aktiebolaget Separator, Stockholm, Sweden. No. 2,687,876. Aug. 31, 1954.

Drier Temperature Control Comprising Balanced Throttle Valve on Steam Line, Air Pressure Chamber, Differential Bellows, Check Valve—A. E. Armstrong, Three Rivers, Mich. No. 2,687,851. Aug. 31, 1954.

Perforating Press for Meat Curing Consisting of Frame, Horizontal Fixed Platform, Vertically Movable Head With Perforating Elements—S. L. Komarik and C. L. Griffith to The Griffith Laboratories, Inc., Chicago. No. 2,688,151. Sept. 7, 1954.

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you would like to receive and enclosing 25¢ for each copy.

PACKAGING

Liquid Distributing Stopper Containing Tubular Wad of Flexible, Permeable Material, Centrally Located Feeder, Folded Tongue—P. Mendelevitch, Paris, France. No. 2,687,543. Aug. 31, 1954.

Packing Machine Punching Attachment Having Movably Mounted Blade, Plurality of Teeth, Thermoplastic Material Feeding, Heating Means—B. Hauser, Cedarhurst to Servit Foods Corp., New York City. No. 2,687,764. Aug. 31, 1954.

Can Feeding Apparatus With Conveyor Chain, Upper and Lower Sprockets, Spaced Flights—T. B. Keesling, Campbell to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,687,796. Aug. 31, 1954.

Paperboard Can Carrier Comprising Integrally Connected Top, Bottom Panels, Side Walls, Carrying Handle—K. A. Weimer, Marion, Ind. to Morris Paper Mills, Chicago. No. 2,687,800. Aug. 31, 1954.

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Barrel Consisting of Hollow Cylindrical Shell, Bottom Closure, Disk-Like Head, Expansible Split Hoop—*G. Lindwall, Oslo, Norway. No. 2,687,822. Aug. 31, 1954.*

Container Having Tubular Outlet, Slidable Sealing Cap, Integral Puncturing Means—*W. E. Horrocks, Lakewood, Ohio. No. 2,687,828. Aug. 31, 1954.*

Liquid Dispensing Container Comprising Closed Receptacle, Top-Wall Aperture, Inwardly Directed Flange, Resilient Plastic Pouring Member—*L. C. Miller to Formold Plastics Inc., Chicago. No. 2,687,831. Aug. 31, 1954.*

Collapsible Hollow Wall Carton Having Bottom, Side Panels, Triangular Foldable Flaps, Tuck-Under Strips, Tabs—*H. Z. Gray, Lebanon, Ohio. No. 2,687,839. Aug. 31, 1954.*

Liquid Container Comprising Rectangular Body, Bellows Fold Top Closure, Retractable Pouring Mouth—*R. H. Innes to Perga Containers, Ltd., Hamilton, Ontario, Canada. No. 2,687,840. Aug. 31, 1954.*

Container Extension Having Cylindrical Portion With Inwardly Projecting Flange, Downwardly Flaring Lip, Resilient Plastic Ring—*R. H. Carter to Fostoria Pressed Steel Corp., Fostoria, Ohio. No. 2,688,418. Sept. 7, 1954.*

Soft Plastic Package Consisting of Rigid Tube Enclosing Premolded Food Body, Flat Base, Flexible Film Wrapper—*L. Peters, Evanston, Ill. No. 2,688,557. Sept. 7, 1954.*

Thin-Walled Sausage Casings Extruded From Water-Containing Fibrous Mass by Air Pressure—*G. J. Huckfeldt, Uetersen, Schleswig-Holstein, Germany. No. 2,688,766. Sept. 14, 1954.*

Beer Can Having Molded One-Piece Body, Tapered Throat Entrance, Internal Annular Groove, Concave-Convex Cover—*E. L. Wagoner, Milwaukee, Wis. No. 2,688,995. Sept. 14, 1954.*

Bottle Carrier Comprising Flat Rectangular Base, Vertical Partition, Grasping Aperture, Circumferential Retaining Wire—*E. Dechar, Flushing to Walter Marshak Inc., Brooklyn, N.Y. No. 2,689,072. Sept. 14, 1954.*

Flexible Bag Filler Having Support Means, Vacuum Cup, Power Actuator, Control Mechanism—*R. W. Twigg to Bartelt Engineering Co., Rockford, Ill. No. 2,689,073. Sept. 14, 1954.*

Beverage Carton of Triangular Cross-Section Comprising Side Walls, Bottom, Countersunk Cover, Vertical Rotatable Imbibing Tube Extending Through Cover and Bent Parallel Thereto—*W. E. Jenkins, Dallas, Tex. No. 2,689,076. Sept. 14, 1954.*

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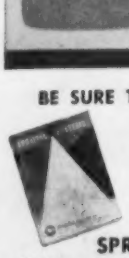

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Men & Companies

Industry

Best Foods, Inc., has signed papers to purchase two companies—Rosefield Packing Co. of Alameda, Calif., and Good Foods, Inc., of Minneapolis, Minn.

Danahy Packing Co., Buffalo, has elected Howard C. Bilger as general manager.

Deerlick Dairy and **Delaware Milk Co.** consolidated operations on Jan. 1.

Fargo Packing & Sausage Co. has completed a $75,000 addition to its plant at West Fargo, N. D.

Food Enterprises, Inc., has purchased the building formerly occupied by Rye (N. Y.) Trust Co. and soon will move its executive offices from White Plains to Rye.

L. C. Forman & Sons Pickle Co. suffered $125,000 damage when a fire swept through its three-story warehouse at Palmyra, N. Y.

General Foods' Maxwell House Div. has opened a new soluble coffee plant in Jacksonville, Fla.

Gibbs & Co. of Baltimore has been sold to **Consolidated Foods Corp.**

Golden Gift, Inc., of Eustis, Fla., is a new firm making citrus concentrates. **Florida Food Products, Inc.,** holds the purchase option on the new plant.

Kasco Mills, Inc., of Toledo, has merged with **Corn Products Refining Co.,** New York City.

Kroger Co. will erect a $2½ million warehouse in Columbus, Ohio. It will service 85 outlet stores in the Columbus area.

Langendorf Bakery Co. is planning a $900,000 plant at Bell Gardens, Calif.

Mooney Creamery, Inc., Saginaw, Mich., has been incorporated by Ronald J. McIntyre for $50,000 to manufacture and deal in dairy products.

National Biscuit Co. will manufacture crackers in Milan, Italy, for European distribution.

Lawrence J. Sauers has been promoted to vice-president and director of American Home Foods, Inc. Mr. Sauers will continue as national sales manager of the firm.

Nechako Brewing Co., Ltd., will build a $1 million brewery this spring at Prince George, B. C.

Peters Meat Products, Inc., has acquired the St. Paul, Minn., branch plant of **Cudahy Packing Co.** The facility will be used as a storage and distribution plant.

Pepsi Cola Co. plans to construct a bottling plant in Philadelphia at an estimated cost of $800,000.

Pillsbury Mills, Inc., has started construction of a $500,000 addition to its Springfield, Ill., warehouse.

Planters Nut & Chocolate Co. of Suffolk, Va. has completed two steel warehouses covering 13,200 sq. ft. in Ivor, Va.

Rochester Dairy Co-operative, Rochester, Minn., soon will construct a new dairy-butter plant.

Rolston Purina Co., Ltd., will build a new cereal plant at Scarborough, Ontario.

Seafood Processors, Inc., Jackson, Mich., has been incorporated for $50,000 by Charles M. Peterson for general manufacturing and merchandising.

S & W Fine Foods, Inc., has started construction of a $2,000,000 plant in San Francisco.

Yukon Mill & Grain Co. of Dover, Del., has filed a charter of incorporation with capital stock of $150,000.

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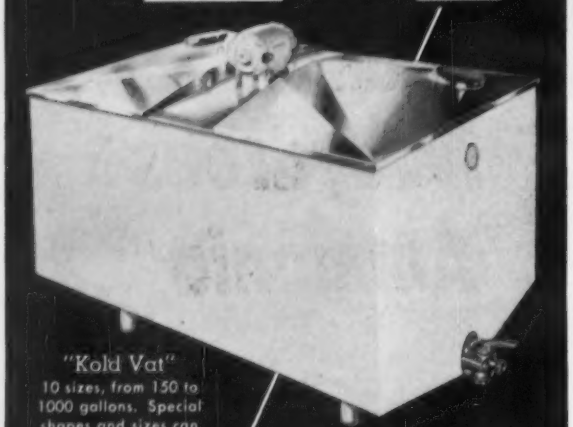

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Dr. Willard M. Bright has been promoted to director of research and development of Lever Brothers Co., New York City. Formerly, he served the company as assistant research director.

Personnel

J. F. Allen has been elected a member of H. J. Heinz Co.'s executive committee. He has also been named vice-president of the company's foreign operations.

Sheldon Allen is now vice-president and treasurer of Leslie Salt Co. He formerly was secretary-treasurer.

Lloyd C. Bellisime has been appointed executive vice-president of Gentry, Inc., Los Angeles.

Charles R. Carry is now executive director of the California Fish Canners Assn.

Harold J. Colton has been appointed vice-president in charge of sales for Blatz Brewing Co., Milwaukee.

James M. Dawson has been elected to the board of Ferro Corp., Cleveland.

M. S. Dixon, director of manufacture, H. J. Heinz Co. of Canada, Ltd., is new president of Ontario Food Processors Assn.

A. F. Fuerth has been named to the presidency of Brading Breweries, Ltd., Ottawa, Canada.

Dr. John C. Garey is now assistant to the vice-president at Red Star Yeast Co.

Eugene C. Gillett, former production superintendent, is new production manager of California & Hawaiian Sugar Refining Corp.'s refinery at Crockett, Calif.,

A. W. Harding is now manager of General Mills' market analysis department.

Augustin S. Hart, Jr., has been elected vice-president of the Quaker Oats Co. He will continue as president of two company subsidiaries.

Clyde Hayward is new senior research associate in the product improvement and development department of Lever Brothers Co.

James T. Jenkins, Jr. has joined Frigidinner, Inc. as vice-president in charge of advertising and sales promotion.

Ernest H. Kieser, vice-president of Kasco Mills before the firm merged with Corn Product Sales Co., is now executive vice-president of Corn Products.

F. L. Kollman was upped to manager of Armour & Co. branch at Toledo, Ohio.

P. T. Molson has been appointed assistant to the president of Molson's Brewery, Ltd.

Gaetan C. Morrissette, former secretary-treasurer for Standard Brands Limited, has been elected vice-president of the Canadian organization.

Maurice V. Odquist has been elected vice-president of Cantrell & Cochrane Corp. He will be in charge of national sales for the firm.

Albert A. Ricker, vice-president in charge of subsidiary operations for Standard Brands, Inc., has now been named as a company director.

Bernard H. Ridder is a new director of the Pfeiffer Brewing Co., Detroit.

M. M. Schneckenburger is now a vice-president of Joseph E. Seagram & Sons, Ltd., of Canada.

Edward F. Swift III has been appointed manager of the Swift & Co. plant at Evansville, Ind.

Glenn G. Lorch has been named to the vice-presidency of Kari-Kold Co. In addition to the administrative duties, Mr. Lorch will devote a portion of his time to the engineering and designing of high and low temperature cabinets.

Associated Industries

American Can Co. announces appointment of W. K. Schmalzriedt as plant manager.

American Chemical Society has elected Dr. Walter O. Lundberg chairman of its Agricultural and Food Chemistry Division.

Beckman Instruments, Inc., has announced promotion of Thomas J. Kehoe to the post of application engineer.

Brockway Glass Co. has elected Finley B. Hess executive vice-president.

Carbide and Carbon Chemicals Co., Division of Union Carbide and Carbon Corp., named Dr. R. L. Bateman, former manager, director of product development. W. A. Woodcock will succeed Dr. Bateman as manager, fine chemicals division.

Conoflow Corp. has appointed Ralph G. Holben, former plant manager, as vice-president in charge of manufacturing.

Continental Can Co. has named Charles B. Stauffacher as vice-president in charge of finance and Lawrence Wilkinson as group vice-president.

Corbett Canning Co., Tabor City, N. C., has been incorporated for $100,000.

Crown Cork & Seal Co., Inc., will erect a new can factory in Baltimore.

Cudahy Packing Co., of Omaha, has sold its meat packing plant in Albany, Ga., to Lykes Brothers, Inc.

Food Machinery & Chemical Corp., Canning Machinery Div., has appointed A. E. Peck technical service representative.

Krafco Container Corp. opened its fourth corrugated box plant in Chicago.

Robert Gair Co., Inc., will establish a new corrugated box plant at Atlanta, Ga.

N. T. Gates Co., Philadelphia, has moved its offices to a recently completed building in Camden, N. J.

Standard Packaging Corp., New York City, has named Homer A. Vilas as a director.

Henry E. Russell has been appointed assistant to the president of Carling Brewing Co. He has previously worked as research associate at New England Mutual Life Insurance Co. and as executive vice-president of Suburban Centers Trust, Boston.

Stearns Magnetic, Inc., Milwaukee, has appointed R. M. Miller as new vice-president.

F. J. Stokes Machine Co. has established a new International Division with headquarters in Philadelphia.

Transparent Package Co., Chicago, has opened a new plant in San Francisco.

Union Carbide of Canada, Ltd., has purchased a plant from Dominion Tar & Chemical Co., Ltd., in Montreal East, which it will use for making polyethylene and other products for food packaging.

Worthington Corp., Harrison, N. J., has elected Hobart C. Ramsey, president, as chairman of the board. Edwin J. Schwanhausser, now executive vice-president, will become president.

Deaths

Richard Nash Gould, southern division manager of Minute Maid Corp.—Dec. 12.

Edward R. Hankins, founder of Hankins Container Co., Cleveland, Ohio.—Dec. 19.

Charles Hess, Sr., 89, retired president of Charles Hess Sausage & Provision Co., Milwaukee.—Dec. 7.

Norbert L. Hoffman, executive vice-president of Hoffman Packing Co.—November 24.

Frederick C. Miller, 48, president of Miller Brewing Co., Milwaukee.—Dec. 17.

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PLANT ENGINEERING

Pressure Transmitter

Principles of operation of flush diaphragm pressure transmitter. Bulletin A-713.—*Swartwout Co., 18511 Euclid Ave., Cleveland 12. (206A).*

Electrical Precipitators

Engineering data on precipitator run by electricity for collection of any solid or liquid matter suspended in gas. 42 p. bulletin.—*Western Precipitation Corp., 1016 W. 9th St., Los Angeles. (206B).*

Evaporative Condensers

Description of features and operation of condenser using same water over again. Bulletins 222 & 309. Each 8 p.—*Vilter Mfg. Co., Milwaukee 7. (206C).*

Centrifugal Castings

Range of products and specifications of heat, corrosion and abrasion resistant, and other alloys available in centrifugal castings. Form LP-15M. 6 p.—*Sandusky Foundry & Machine Co., Sandusky, Ohio. (206D).*

Steel Castings

Information on range of specialty carbon and alloy steel castings. Form 20. 4 p.—*Farrell-Cheek Steel Co., Sandusky, Ohio. (206E).*

Vibration Isolators

Features and uses of shock and high vibration isolators. Bulletin 541. 8 p.—*Barry Corp., Watertown, Mass. (206F).*

Sanitary Pump

Description and illustrations of corrosion and contamination resistant pumps. Leaflet.—*Vanton Pump & Equipment Corp., Empire State Bldg., New York City 1. (206G).*

Power Drive

Detailed description, specifications, diagrams and photos of variable speed reducer. Bulletin K-1. 4 p.—*Cleveland Worm & Gear Co., 3269 E. 80th St., Cleveland 4. (206H).*

Filter Unit

Performance data on and features of filter which operates on 3-step principle of precoating, filtering and backwash cleaning. Bulletin F-55. 4 p.—*Croll-Reynolds Engineering Co., Inc., 17 John St., New York City 38. (206I).*

Refrigeration Units

Features and advantages of multi-cylinder Freon compressors, with photos and operating diagrams. Bulletin 320. 8 p.—*Vilter Mfg. Co., Milwaukee 7. (206J).*

Freezing Equipment

Equipment for freezing produce adaptable to any shape or size of room. Bulletin 223. 4 p.—*Vilter Mfg. Co., Milwaukee 7. (206K).*

Pump Types

Information on circulating and coolant pumps, with performance curves, cross-sections, and dimensions. Form 7074-D. 20 p.—*Ingersoll-Rand Co., 11 Broadway, New York City 4. (206L).*

Water Conditioning Units

Description of line of water conditioning equipment and specialties. Bulletin 6210. 4 p.—*Cochrane Corp., Philadelphia. (206M).*

Flow Pumps

Features, dimensions, materials table and sectional drawings of mixed flow and axial flow pumps. Form 7280. 4 p.—*Ingersoll-Rand Co., 11 Broadway, New York City 4. (206N).*

Proportioning Pumps

Details on proportioning pump with no packing, high speed valves and pulse free flow. Bulletin AP-54. 6 p.—*Hills-McCanna Co., 3025 N. Western Ave., Chicago 18. (206O).*

Plate Filter

Features of de luxe model stainless steel plate filter with spring pressure clamping. Bulletin 649. 4 p.—*W. M. Sprinkman Corp., 4022 N. Port Washington Ave., Milwaukee 12. (206P).*

Cream Cooler

Details on unit for chilling and packing cream having a butterfat content of 70% or higher. 4 p. brochure.—*W. M. Sprinkman Corp., 4022 N. Port Washington Ave., Milwaukee 12. (206Q).*

Pump Units

Information on turbine type, centrifugal, horizontal, and vertical pumps. 8 p. bulletin.—*Aurora Pump Co., Aurora, Ill. (206R).*

Air Release Valves

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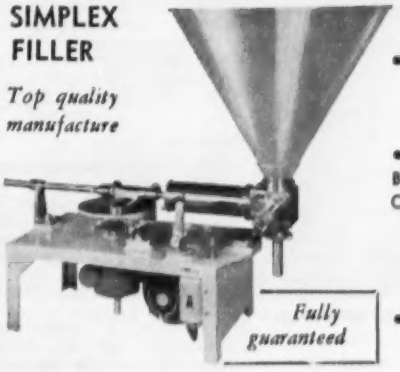

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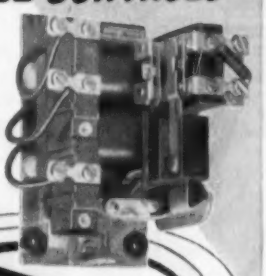

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General Cleaner

Details on low-cost cleanser for general use. Technical Report B-3018.—*Oakite Products, Inc., 27A Rector St., New York City 6. (211Q).*

MANAGEMENT

Management Courses

Description of course in executive communication, 1955 schedule. 14 p. catalog.—*American Management Association, Hotel Astor, Times Square, New York City 36. (211R).*

Production System

Explanation of how to fit more production units into a smaller manufacturing area. 32 p. booklet.—*Alden Systems Co., Alden Research Center, Westboro, Mass. (211S).*

Truck Refrigeration

—*Continued from page 95*

at each side of the cabinet, two front doors give into the empty-case areas. At the rear, two cabinet doors and two empty-space doors, one at each side, complete the body enclosure.

The other combination trucks—the wholesale milk-ice cream units—are of the cab-over-engine (White) type with two-compartment bodies (built by Batavia Body Co., Batavia, Ill.). Chassis are of the low-dropped-frame type requiring only one step by driver to enter or leave (instead of the old step-up-into and step-down). This minimizes fatigue of the driver and reduces his case-handling time.

Front compartment, with 4½ in. of the glass fiber insulation, has capacity for storing 150 cases (24 qt. in each) of milk at 35 deg. F. Rear compartment, with 7½ in. insulation, can hold 450 gal. of ice cream at −50 F.

The straight wholesale milk or ice cream trucks have one compartment for carrying either milk or ice cream.

An attractive color scheme boosts economic value of the fleet. All the dark portions of the trucks, including lettering, are in red, while the panels are white. New plan of the company is to reduce truck refrigeration costs by changing the roof color from red to white on the basis of the fact that white will absorb less of the sun's rays than the red, thus aiding in keeping heat from the truck interior.

From Two to One

Retail routes are operated 6 days per week, with every-other-day service on the two divisions of each route. Truck starts are scheduled between 3 and 6 A.M. Of course, ice cream cannot be left on doorsteps where refrigeration isn't available. If not delivered to the customer's hand on the first stop, a call-back is made.

Combination wholesale trucks make one trip per day, delivering both ice cream and milk to some stops and either milk or ice cream to others. These trucks also deliver the standard dairy products.

Economy is effected in that one truck and one man thus can do the job in sparsely populated areas, where formerly two trucks and two drivers were required. The company does not, however, recommend combination trucks for metropolitan areas. Here, straight milk or ice cream trucks are utilized.

End (Resume reading on page 96)

Rockets Canning Line

—*Continued from page 71*

can move. Screw position can be changed at any time while machine is operating to regulate speed.

Pump and hydraulic motor are closed-circuit connected. Oil from pump travels through the motor, and discharge from motor goes back through pump. Rate of machine braking (deceleration), therefore is influenced by the speed at which oil is vented from the larger control piston. Smaller control piston now moves pump radial pistons toward zero stroke to stop pump output. As volume of oil to motor decreases, motor speed likewise decreases.

However, during deceleration, machine's inertia drives hydraulic motor as a pump. Oil delivered by motor then drives the pump and regenerates power through the electric motor. Excess oil is discharged past the built-in relief valve, which limits the braking torque. Braking speed and torque are adjustable.

Pump-discharge and return lines are protected against overloads by adjustable relief valves, which limit maximum hydraulic torque on acceleration or deceleration.

An electric signal, hooked up with a micro-switch (serving as stop button), senses position of relief-valve plunger as it opens to by-pass oil. Pump then goes to zero position, thereby taking power off of the hydraulic motor.

As for further food-industry uses, this type of drive may be employed where—

1. Accurate speed control of a machine is required.
2. Overload protection is essential.
3. Cushioning of acceleration and deceleration are sought to eliminate strain on machine parts or product.

There are other notable points. For example, the pump can be remotely located and the motor installed in a dangerous area since it does not create ignition. Too, a hydraulic motor is not affected by wet conditions or hosing.

End (Resume reading on page 72)

Sub Scalding Poultry

—Continued from page 102

in some sections of the trade that part of the market still prefers semi-scalded produce.

Many of the older turkey dressing plants were constructed of wood or metal sheeting, with open rafters and limited draining facilities. The expenditure necessary to install sanitary inner walls, ceilings and the necessary service fittings frequently exceeds the value of the plant.

Most were built with a 34 deg. F. cooling room in the middle of a New York dressing sequence. This structure is generally an obstacle to the efficient organization of the ice chilling arrangements which replace it. The increment in cooling gained by wheeling in loaded tanks hardly compensates for the layout handicaps.

A few plants occupy sites which preclude any possibility of adding evisceration or chilling space. Nevertheless it is feasible for processors to sub-scald and eviscerate in premises which do not meet federal inspection standards in their entirety, provided that local sanitary authorities are satisfied and no defect is found in the product at the market. Certainly, such a course is preferable to accumulating a heavy overhead burden in small plants lacking the output to support it.

Continued use of the older dressing procedures stems from the desire to maintain the protection against deterioration afforded by the turkey's original outer skin, and the continued demand for fresh dressed birds among some consumer groups. Trade interests with a substantial New York dressed bird clientele encourage this preference as a measure of market protection. Nevertheless, the distribution of fresh dressed poultry is rapidly disappearing from the marketing scene.

New York dressing is at a disadvantage in the present technical and marketing environment. Attractive display is more difficult than with individually packaged poultry. There is now a suggestion of lower quality in product which carries no convincing evidence of grade or origin.

Finally, the overall cost of dressing at a specialized plant and evisceration at the retail counter exceeds that of dressing and evisceration in the one plant.

References

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2. W. W. Halverstall, Hub City Erection Co., Sacramento, H. R. Priestadt, Jr., Reynolds Metal Co., San Francisco, and L. L. Sammet, Dept. of Agricultural Economics, University of California, Berkeley.

3. L. L. Sammet and I. F. Davis, *Building and Equipment Costs, Apple and Pear Packing*, Giannini Foundation of Agricultural Economics. Mimeo. Rept. No. 141, University of California, p. 19-21, (Berkeley, Dec. 1952).

End (Resume reading on page 105)

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(Continued on opposite page)

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(Continued from opposite page)

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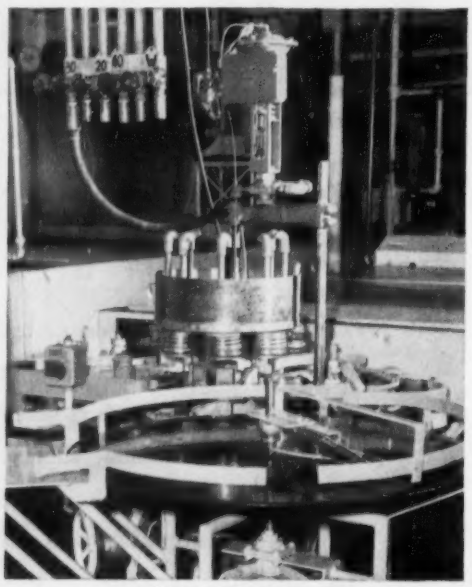

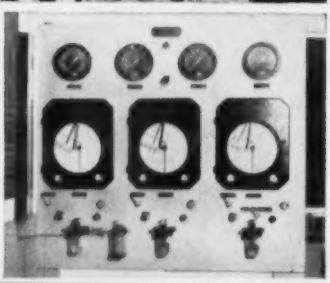

Taylor FULSCOPE* Indicating Temperature Controllers regulate steam to heating coils in mixing tanks (above left). Picture at right above shows Taylor VALVE-PRECISOR* actuated control valve used as a level control for the filler bowl. Panel (at right) shows Recording Density Controllers which maintain desired brix—also control level in syrup tanks.

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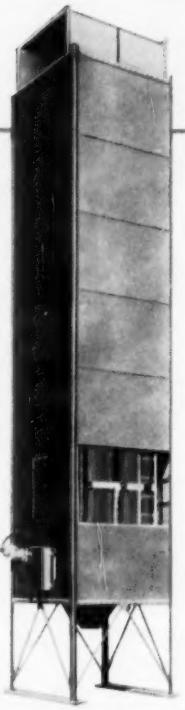

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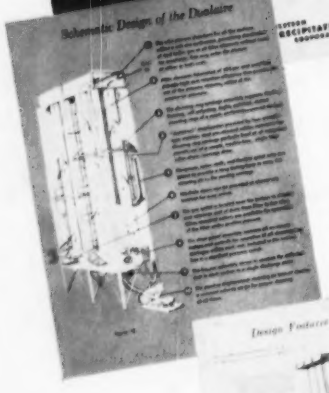

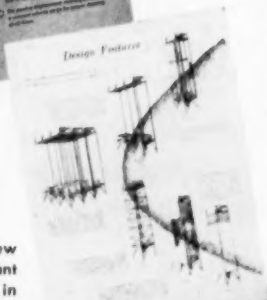

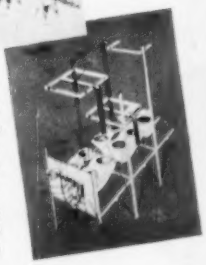

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